

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR THE IMPROVEMENT OF
CENTRAL FUNCTIONS OF JAFFNA TEACHING HOSPITAL
IN
THE DEMOCRATIC SOCIALIST REPUBLIC
OF
SRI LANKA

AUGUST 2005

JAPAN INTERNATIONAL COOPERATION AGENCY
GRANT AID MANAGEMENT DEPARTMENT

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Preface

In response to a request from the Government of Sri Lanka, the Government of Japan decided to conduct a basic design study on the Project for The Improvement of Central Functions of Jaffna Teaching Hospital In The Democratic Socialist Republic of Sri Lanka and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent a study team to Sri Lanka from February 13 to March 14, 2005.

The team held discussions with the officials concerned of the Government of Sri Lanka, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Sri Lanka from July 17 to 26, 2005 in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Sri Lanka for their close cooperation extended to the teams.

August 2005

Seiji Kojima
Vice President
Japan International Cooperation Agency

August 2005

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for The Improvement of Central Functions of Jaffna Teaching Hospital In The Democratic Socialist Republic of Sri Lanka.

This study was conducted by Yamashita Sekkei, Inc. and International Total Engineering Corporation under a contract to JICA, during the period from February to August 2005. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Sri Lanka and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

長岡 領男

Mineo Nagaoka

Project Manager,
Basic Design Study Team on
The Project for The Improvement of Central
Functions of Jaffna Teaching Hospital
In The Democratic Socialist Republic of Sri Lanka

The Joint venture between
Yamashita Sekkei Inc. and
International Total Engineering Corporation

The Project for The Improvement of Central Functions of Jaffna Teaching Hospital in The Democratic Socialist Republic of Sri Lanka



Project Site

City of Jaffna

Project Location Map



Perspective of the Project

List of Abbreviations

ADB	Asian Development Bank
AFC	Anti Filaria Campaign
AIDS	Acquired Immunodeficiency Syndrome
AMC	Anti Malaria Campaign
AVR	Automatic Voltage Regulator
CSSD	Central Supply and Sterilization Department
BCG	Bacille Calmette Guerin
BES	Bio-Medical Engineering Services
BH	Base Hospital
BHN	Basic Human Needs
BS	British Standard
CD	Central Dispensary
CD & MH	Central Dispensary and Maternity Home
CEB	Ceylon Electric Board
CECB	Central Engineering Consultancy Bureau
COT	Central Operating Theatre
CT	Computerized Tomographic X-Ray Unit
CSSD	Central Sterile Supply Department
DFID	Department for International Development
DH	District Hospital
DP	Drain Pipe
DPDHS	Deputy Provincial Director of Health Service
DPT	Diphtheria, Pertussis, Tetanus Vaccine
ECG	Electrocardiogram
EEG	Electroencephalogram
ENT	Ear, Nose, and Throat
EPI	Expanded Programme on Immunization
EPS	Electric Pipe Shaft
FORUT	Solidaritetsaksjon FOR UTvilking
GDP	Gross Domestic Products
GNI	Gross National Income
GNP	Gross National Product
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH
HIV	Human Immunodeficiency Virus
ICD	International Statistical Classification of Diseases and Related Health Problems
ICU	Intensive Care Unit
IEC	Information, Education, and Communication
IMR	Infant Mortality Rate
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
JTH	Jaffna Teaching Hospital
JVP	Janatha Vimukthi Peramuna
LTTE	Liberation Tigers of Tamil Elam
MCH	Maternity Child Health
MOH area	Medical Officer of Health area

MRI	Medical Research Institute
NECORD	North East Community Restoration and Development Project
NEERP	North East Emergency Reconstruction Project
NGO	Non-Governmental Organization
NICU	Neonatal Intensive Care Unit
NHS	National Institute of Health Science
O.P.D.	Out-Patient Department
OPEC	Organization of Petroleum Exporting Countries
ORT	Oral Rehydration Therapy
OT	Operation Theatre
PH	Provincial Hospital
PHC	Primary Health Care
PICU	Pediatric Intensive Care Unit
PS	Pipe Shaft
PU	Peripheral Unit
SCOPP	Secretariat for Co-ordinating the Peace Process
SIDA	Swedish International Development Agency
SIHRN	Sub-Committee on Immediate Humanitarian and Rehabilitation Needs in The North and East
SIRUP	Small Scale Infrastructure Rehabilitation and Upgrading Project
SLT	Sri Lanka Telecom
STD	Sexually Transmitted Diseases
UNDP	United Nations Development Program
UNFPA	United Nations Population Fund
UNHCR	Office of the United Nations High Commissioner for Refugees
UNICEF	United Nations International Children's Fund
UPS	Uninterrupted Power Supply
USAID	The United States Agency for International Development
WB	World Bank
WHO	World Health Organization

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SUMMARY

SUMMARY

The Democratic Socialist Republic of Sri Lanka (hereinafter “Sri Lanka”) has a land area of 62,700 km², a population of 19 million (estimate for 2002), and a population growth rate of 1.1. The per-capita GNI is US\$ 930 (estimate for 2003).

The 6-year development plan (1999-2004) of the Government of Sri Lanka targets the provision of satisfactory health care services and district-level improvement of medical institutions. The National Health Policy (President’s Decree in 1997) of the Government of Sri Lanka calls for the provision of free-of-charge health care services to all citizens and the establishment of top-referral hospitals in each area. Yet the protracted civil war between the Government and the Tamil extremist group (Liberation Tigers of Tamil Elam: LTTE), a conflict which has continued for more than 20 years, has considerably impeded development in the northwestern parts of the country dominated by the LTTE.

Jaffna Teaching Hospital, the target facility in this Project, is the top-referral hospital in the city of Jaffna. It is the only tertiary care facility in the northern region, a section of the country which includes not only the Jaffna District of Jaffna Province, but also the Kilinochchi District and other adjacent districts. Many of the lower-level medical facilities in the region have been destructed and are not capable to properly function. Financial constraints and difficulties in deploying medical workers have considerably impeded efforts to improve these lower-level hospitals since the cease fire agreement. A tremendous number of patients are treated at the Jaffna Teaching Hospital, a facility which also functions as a primary and secondary care hospital. Yet since no major facility investment were done during 20 years of civil war, the facilities in these departments of this hospital are now decrepit and in ill repair. The hospital is unable to adequately perform its expected functions due to the lack of necessary facility and medical equipment.

While the civil war resulted in a decrease in the population of the Jaffna District from 730,000 in 1981 to less than 500,000 in 2001, the cease fire agreement has prompted the return of inhabitants. The population is expected to increase to 590,000 by the end of 2003, and eventually to a little less than 1 million based on the estimation from the pre-civil war distribution of national population. The Hospital is hence expected to receive further increases in the number of patients until lower-level medical facilities are sufficiently developed.

Jaffna Teaching Hospital must regain its functions as a tertiary level teaching hospital and continue functioning as a primary and secondary care hospital until the lower-level medical facilities are rehabilitated and developed.

The above hospital started preparation of the Reconstruction Project soon after the cease fire

agreement in February 2002 and three times requested aid from the Government of Japan, in July 2002, May 2003 and June 2003. In addition, the hospital also prepared a Master Plan for the overall improvement during this period. In response to these three requests, the Government of Japan implemented the Preliminary Survey in September 2004. In this study, the positioning and priorities of the Grant Aid in the Master Plan formulated by the hospital were discussed. As a result, the relevance of the Grant Aid project was confirmed and it was agreed that the project would be implemented with focus on the central functions of the hospital (Operation Theater Complex, Central Laboratory Complex, Emergency Dept., and Outpatient Dept.)

In response to the above agreement, the Government of Japan determined to conduct a Basic Design Study and the Japan International Cooperation Agency (JICA) sent the Basic Design Study Team from February to March 2005. The Basic Design Study Team organized the basic design and the equipment plan for the facilities in accordance with the analysis conducted after their return to Japan. Explanation of the draft of the basic design was conducted in July 2005, and this Basic Design Study Report was prepared.

As a result of the study, it was confirmed that the objective of this project is relevant and urgent. This objective is to improve the health care service in the northern region and to promote the reconstruction of the whole region by improving the central health care functions of Jaffna Teaching Hospital and thereby contribute to the restoration of the whole functions of the hospital.

The outline of the project for the improvement of central functions of Jaffna Teaching Hospital is as follows.

- (1) Site : Within the premises of Jaffna Teaching Hospital
- (2) Organization : Responsible Agency: Ministry of Healthcare, Nutrition & Uva Wellassa Development
Implementing Agency: Jaffna Teaching Hospital
- (3) Outline of the project: The Central Functions Buildings
(Diagnostic Imaging, Operation Theater Complex, Central Supply & Sterilizing Department, Intensive Care Units, Laboratory Complex)
Construction of the facilities, and procurement/installation of the equipment

Outline of Facilities

	Elevated Water Tank			
4th Floor 30 m ²	(Space for Future Expansion of Rooms for Medical Education)	Space for Air Conditioner Outdoor Units	Generator	
3rd Floor 2,070 m ²	Operation Dept. Management Room	ICUs 20 ICU beds 2 Rooms for infections Total 22 beds		Central Laboratory Complex Clinical Pathology, Hematology, Biochemistry, Microbiology
2nd Floor 2,200 m ²	Operation Theater Complex 8 Operation rooms (incl. 2 for infections), Recovery Rooms			Central Supply & Sterilizing Dept.
1st Floor 2,370 m ²	Central Facilities for Diagnostic Imaging 4 Radiology Rooms, Dental X-ray, Mammography Endoscopy Room, Physiology Room (8 booths, ECG, EEG, Ultrasound)			Machinery Room, etc.
Total Floor Area <u>6,870 m²</u>			Water Reservoir, etc.	

Building structure: Reinforced concrete structure

Outline of Equipment

Category	Main equipment
Central Laboratory Complex	Automatic biochemistry analyzer, Blood gas analyzer, ELISA reader, Flame photometer, Safety cabinet, Microscope, Osmometer, Semi automated coagulation analyzer etc. Total 36 items
ICUs	Central monitor, Ventilator, ICU bed etc. Total 23 items
Operation Theater Complex Central Supply and Sterilizing Department	Anesthetic apparatus, Ventilator, Apparatus set, Operation lamp, Operation monitor, Operation table, Autoclave, Automatic disinfectant etc. Total 34 items
Central Facilities for Diagnostic Imaging	X-ray system (simple bucky stand, fluoroscopy, panorama type for dentistry, mammography), Ultrasound scanner, X-ray film automatic processor, Endoscope, EEG, ECG etc. Total 27 items

The period required for the implementation of this project is estimated to be approximately 31 months. This includes the time for detailed design (6 months for the detailed design works, 4 months for tender works) and 21 months for construction works including equipment procurement, and installation works. This estimate is calculated from consideration of the scale of the facilities, the construction conditions on site, the budget systems of both Japan and Sri Lanka and the process for demolition of the existing buildings at the construction site. The total project cost is estimated at 2,451 million yen (1,927 million yen to be borne by Government of Japan and 524 million yen to be borne by Government of Sri Lanka). This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant.

The operation and maintenance cost of Jaffna Teaching Hospital after completion of this project is estimated to be approximately 282 million rupee (approximately 310 million yen). This is an increase of 19% compared with the current expenditure in 2004 but is an increase of 12% compared with the gross expenditure including the investment expenditure. This cost has been explained to the recipient country at the time of the draft basic design briefing, to which the relevant hospital and the Ministry of Healthcare, Nutrition and Uva Wellassa Development (MOH) agreed. For that reason, it is considered that they will not have any problem in future maintenance.

The following direct effects are expected to result from implementation of this project:

1) Restoration of functions as a tertiary care facility

The health care functions of the Jaffna Teaching Hospital as a tertiary care facility can be restored by improving the facilities and equipment of the hospital that have been decrepit with no appropriate capital investment made in it for the past 20 years or more. There are no other tertiary care hospital existing in the northern region, patients requiring high-level health care service are transferred to Colombo City, 420 km away from the region, causing significant burden on the patients. Because the transportation costs are unaffordable, the poverty group cannot receive appropriate tertiary health care service. The improving of facilities and equipment in this project will enable prompt and appropriate provision of the high-level health care services needed in this region and permit the qualitative improvement of the healthcare service in the whole region.

2) Promote efficient health care service in the hospital by centralization and integration of the central health care functions

The efficiency of hospital functions can be improved by centralizing the operation rooms and intensive care units that are distributed in individual departments at present, and integrate them in the same building with the diagnostic imaging rooms and the laboratory rooms that are currently located separately. More specifically, such effects as shortening of patients' waiting time, shortening of travel distance within the hospital, shortening of the time required for test results to become clear are expected. In addition, effective utilization of limited operation resources such as anesthesiologists, skilled nurses for surgery, sterilization equipment of surgical instruments and so on, through the centralization of operation departments is expected to improve efficiency of high level medical service.

3) Promoting the implementation of the Jaffna Teaching Hospital Master Plan

There is a great demand for the Jaffna Teaching Hospital as the only advanced medical institution in the northern region with the bed occupancy rate amounting to 120%. To cope with the situation, the hospital formulated a Master Plan for overall improvement, and started the improvement from 2004. The improvement of the central health care functions is the key phase of this Master Plan as it is integral to the overall efficient operation of the hospital but is most difficult to improve. Once this department has been improved, the improvement of mainly ward units which are relatively easy to implement can follow. Thus this project implemented by Japanese grant aid scheme will comparatively shorten the whole improvement period. The tertiary health care service urgently needed in the northern region can be provided sooner.

In addition, the following indirect effects are expected to result from the implementation of this project:

1) Improvement in medical education functions

The Hospital is the teaching hospital of Jaffna University Medical Faculty, the only one medical faculty in the northern region. Provision of human resources to medical institutions in the region is chiefly shouldered by this medical faculty. Human resources in many of the lower-level medical facilities are too insufficient to provide appropriate health care services (the number of physicians in Jaffna Province as of 2002 was 0.2 per one thousand population against the national average number of physicians per one thousand population being 0.5). It is expected that improvement in the central functions of Jaffna Teaching Hospital and restoration of the functions as a tertiary care facility by this project will result in improvement in quality of the medical education of the region and increase in the number of physicians in the region.

2) Promotion of reconstruction of the northern region

The northern region, which was exhausted by the protracted civil war, is pursuing improvement by making the most of donated funds in accordance with the Reconstruction Project formulated after the cease fire agreement. The region has so far started improvement of relatively smaller scale structures such as elementary schools and clinics. This project targets central functions of the tertiary care facility, in which full-fledged improvement will result in promotion of the reconstruction project for the whole region.

In terms of smooth and effective implementation of this project, the following points are recommended:

- (1) This project will centralize the Operation Theater Complex of Jaffna Teaching Hospital and

therefore require acquisition of specialized management knowledge. To this end, appropriate education and training needs to be provided to anesthesiologists and nurses about the management of the Operation Theater Complex.

- (2) In order to restore the functions of the hospital as a tertiary care facility on a full-scale basis, it is desirable that Wards and the Outpatient Department be appropriately improved in accordance with the Master Plan. In addition, the functions as an educational hospital need to be continuously improved in accordance with the Master Plan as well.
- (3) It is desirable that future Reconstruction Projects continuously improves the lower-level medical facilities as well, allow the referral system in health care to be restored and result in alleviation of the concentration of patients on Jaffna Teaching Hospital.
- (4) Maintenance of medical equipment is conducted by engineers of the Biomedical Engineering Service (BES) under the Ministry of Healthcare, Nutrition and Uva Wellassa Development (MOH), who are stationed inside the Jaffna Teaching Hospital. However, it is desired to further strengthen the maintenance system to execute continuous and effective maintenance work through such measures as concluding maintenance contracts with the agencies for the manufacturers of sophisticated equipment.
- (5) It is desirable that an annual report concerning the management status of the hospital (such as the disease structure of outpatients, the disease structure of inpatients, the number of operations and its breakdown, the number of laboratory testing and its breakdown, the bed occupancy rates by department, the average lengths of the hospital stay by department, the number of patients referred to Jaffna Teaching Hospital, the number of patients referred to higher-level medical facilities in other cities, and the financial status) along with the implementation of this project. This will enable the continuous monitoring of the management status of the hospital and allow formulation and implementation of appropriate improvement plans in the future.

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- Letter of Transmittal**
- Location Map/Perspective**
- List of Abbreviations**
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Chapter 1 Background of the Project

Chapter 1 Background of the Project

Since the cease fire agreement in 2002, the Government of Sri Lanka has submitted requests for aid to the Government of Japan several times along with the Health and Medical Service Rehabilitation Project in the northern region. After receiving this request, the Government of Japan implemented a Preliminary Survey in September 2004 and discussed the direction of cooperation with the hospital. As a result, it was confirmed that the project will focus on the central functions

Table 1-1 Transition of the Application Form

No	Request Date	Request Amount	Description of Request
1	July 2002	US\$16,887,100 (approximately 1.83 billion yen)	Renovation of the Obstetrics and Gynecology Ward, Pediatrics Ward, Surgical Ward etc. Request for 37 items of equipment.
2	May 2003	Rs.1,500million (approximately 1.83 billion yen)	Construction of the Laboratory Ward, Surgical Ward, Cardiac/Neurosurgery Ward, morgue and others. Request for 102 items of equipment
3	June 2003	US\$33,432,813 (approximately 3.64 billion yen, including the equipment amount of approximately 1.36 billion yen)	Construction of the Outpatient Ward, Central Care Ward, Surgery & ICU Ward, Emergency Care Ward, Hospital Ward, kitchen, morgue and others based on the JTH Master Plan. No equipment list attached.

The details of facilities described in the final request submitted to the JICA office at the end of 2004 are as follows. Departments involved in the Master Plan, which was prepared by the Jaffna Teaching Hospital, are also described on the side for reference.

Table 1-2 Detailed Description of the Request after the Preliminary Survey

	JTH Master Plan	Request at the end of 2004
	Area m ²	Area m ²
Operation Theater Complex	Operation rooms: 11 rooms	Operation rooms: 14 rooms
	Recovery rooms: 30 beds	Recovery rooms: 15 beds
	ICUs: 20 beds	M ICUs: 10 beds
		S ICUs: 6 beds
		P ICUs: 4 beds
		HDU: 10 beds
		Total 30 beds
		Central Supply & Sterilizing Dept
		Dept
	Subtotal	Subtotal
	6,194	5,900
Central Laboratory Complex	Pathology Testing	Microbiological Testing
		Pathology Testing
		Hematological Testing
		Biochemical Testing
		EEG
		ECG
		Endoscopy Testing
Subtotal	Subtotal	
	1,920	2,400

	JTH Master Plan		Request at the end of 2004	
		Area m ²		Area m ²
Central Facilities for Diagnostic Imaging	Diagnostic rooms	1,300	MRI	
	Records management rooms	800	CT: 2 rooms	
			X-rays: 4 rooms	
			Ultrasound diagnosis: 2 rooms	
			Digital arteriogram room	
			Dental x-ray room	
			Mammography room	
			SPECT nuclear medicine testing room	
			Computer image processing room	
	Subtotal	2,100	Subtotal	3,300
Emergency Dept.	Outpatient surgery, ICUs, Recovery, total 15 beds	748	Treatment rooms: 6 beds	300
	Treatment-related rooms: 10 rooms	140		
	Beds for monitoring: 80 beds	840		
	Emergency Office Administrative division	280		
	Subtotal	2,008	Subtotal	300
Administration Dept.			Office Administration Division	
			Auditorium for 200 people	
			Equipment maintenance room	
			Subtotal	2,500
Outpatient Dept.			Treatment rooms: 5 rooms	
			Diagnostic rooms: 8 rooms	
			Subtotal	2,000
Others			Physiotherapy	1,500
	Total	12,222	Total	17,900

In the Preliminary Survey it was agreed that the scope of cooperation would be limited to the central functions. In the Basic Design Study, it was confirmed that the plan would be concentrated on the central functions, including only four departments: the Operation Theater Complex, the Intensive Care Unit, the Central Laboratory Complex and the Central Facilities for Diagnostic Imaging. It was confirmed that other functions in the above list, the Emergency Department, Administration Department, Outpatient Department and Physiotherapy Department, are of lower priority and will not be included in the central function building.

Moreover, it was requested that the contents basically conform to the Master Plan formulated by the Sri Lankan side. In the Master Plan, the Emergency Department was planned as a independent building from the start, and it was confirmed that this project is consistent with the Master Plan.

Chapter 2 Contents of the Project

Chapter 2 Content of the Project

2-1 Basic Concept of the Project

2-1-1 Overall Goals and Project Purpose

The Democratic Socialist Republic of Sri Lanka (hereinafter “Sri Lanka”) has a land area of 62,700 km², a population of 19 million (estimate for 2002), and a population growth rate of 1.1. The per-capita GNI is US\$ 930 (estimate for 2003).

The 6-year development plan (1999-2004) of the Government of Sri Lanka targets the provision of satisfactory health care services and district-level improvement of medical institutions. The National Health Policy (President’s Decree in 1997) of the Government of Sri Lanka calls for the provision of free-of-charge health care services to all citizens and the establishment of top-referral hospitals in each area.

Yet the protracted civil war between the Government and the Tamil extremist group (Liberation Tigers of Tamil Elam: LTTE), a conflict which continued for about 20 years, has considerably impeded development in the northwestern parts of the country dominated by the LTTE.

Jaffna Teaching Hospital, the target facility under this Project, is the top-referral hospital in the city of Jaffna. It is the only tertiary care facility in the northern area, a section of the country which includes not only the Jaffna District, but also the Kilinochchi District and other adjacent districts. Many of the lower-level medical facilities in the region have been destructed and are not capable to properly function. Financial constraints and difficulties in deploying medical workers have considerably impeded efforts to improve these lower-level hospitals since the end of the civil war. A tremendous number of patients are treated at the Jaffna Teaching Hospital, a facility which also functions as a primary and secondary care hospital.

Considerable efforts have been made to establish and improve specialized departments at Jaffna Teaching Hospital and thereby ensure that it can serve its intended function as a tertiary care facility. The two newest departments, the Department of Orthopedics and the Department of Oncology, have been in operation since January 2003 and December 2004, respectively. Thirteen departments operate within the specialized care unit. Yet since no major facility investment were done during 20 years of civil war, the facilities in these departments of this hospital are now decrepit and in ill repair. The hospital is unable to adequately perform its expected functions due to the lack of necessary medical equipment.

The poor condition of the facilities has also been preventing Jaffna Teaching Hospital from serving its functions as a training institution for medical students. As an added disadvantage, very few of the medical students trained at the hospital remain there after graduation. Many of these graduates move out to Colombo, where working conditions and other factors are generally more favorable.

While the civil war resulted in a decrease in the population of Jaffna District from 730,000 in 1981 to less than 500,000 in 2001, the cease fire agreement has prompted the return of inhabitants. The population is expected to increase to 590,000 by the end of 2003, and eventually to a little less than 1 million based on the estimation from the pre-civil war distribution of national population. The Hospital is hence expected to receive further increases in the number of patients until lower-level medical facilities are sufficiently developed.

Jaffna Teaching Hospital must regain its functions as a tertiary level teaching hospital and continue functioning as a primary and secondary care hospital until the lower-level medical facilities are rehabilitated and developed. Unless its facilities are urgently improved, its prospects for success in these capacities are slim. In specific terms, this Project seeks to improve the central functions, the core functions of the Hospital, in order to improve the health care services provided in the northern region and to facilitate the restoration of the region as a whole.

2-1-2 Outline of the Project

This Project seeks to achieve the aforementioned goals by improving facilities and equipment and restoring the efficiency and functions of health care services. The implementation of this Project is expected to lead to the establishment of tertiary care services in the northern region, provide access to reliable medical services to the inhabitants in the region, and facilitate the restoration of the region overall. In specific terms, the Project calls for the construction of facilities to bear the central functions of the hospital (Operation Theater Complex, Central Supply & Sterilizing Department (CSSD), Intensive Care Units (ICUs), Central Laboratory Complex, and Central Facilities for Diagnostic Imaging) and to procure and install necessary medical equipment.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

2-2-1-1 Basic Policy

- 1) The activities under this Project will conform closely with the Master Plan already developed by Jaffna Teaching Hospital. The major modification from this Master Plan will be a change in location of the central functions of the Hospital. The new facility under this Project including the central operation complex will be located at the front (south) area of the Hospital site. This site was originally planned for the Cardiology Unit. The future Cardiology Unit will be planned in the north area, originally reserved for the central operation complex. Otherwise the Project will be implemented basically in accordance with the Master Plan.
- 2) Provision for extension of the facility to accommodate the functions as a teaching hospital will be incorporated.
- 3) The Project contents will be well within the implementation in Japan's grant aid scheme. Under the formulated plans, the works to be conducted by the Sri Lankan side will be consistent with the works to be conducted by the Japanese side. Especially careful steps will be taken to ensure that the relocation and demolition of the facilities in the planned construction site are sufficiently coordinated.
- 4) Consistency with other plans implemented at the Hospital will be ensured and avoid overlaps of equipment and other materials.
- 5) The Project contents will be well within the maintenance and management capabilities of the Hospital and the Ministry of Healthcare, Nutrition, and Uva Wellassa Development (MOH).
- 6) The possibility of a Japanese technical assistance project will be considered.

2-2-1-2 Policy on Natural Conditions

The city of Jaffna is located at latitude of 9.47°north and longitude of 80.04°east. According to records for the last four years, the lowest temperature has been 17°C; the highest temperature, about 37°C; average relative humidity, 70 to 80%; the largest daily rainfall, 216 mm (recorded on September 15, 2001), and the largest wind velocity, 13.7 m/s (recorded on June 12, 2001). The dominant wind direction is southwest from May to September and northeast from December to February. Because of the low latitude, the sun has a high culmination height.

In the design of the facilities, eaves and louver-like forms will be utilized to protect the operating rooms and other areas from sunlight and reduce the air-conditioning loads. The waiting rooms and related areas will be planned as open-corridor types, utilizing natural ventilation.

Water is scarce in Jaffna District and local ordinances require that the rainwater be utilized. The Hospital is utilizing well water to supplement the unstable supply of city water. This Project will also make use of rainwater, city water, and well water.

2-2-1-3 Policy on Socioeconomic Conditions

The workers in medical facilities in Sri Lanka are generally classified into physicians, nurses, and minor staff. Lounges and changing rooms will be provided for each of these categories. The facility plans in this Project will be based on the facilities of other teaching hospitals in Sri Lanka.

British influence is strong in Sri Lanka and many Sri Lankan physicians have studied abroad. The operation departments are generally run by highly independent organizations consisting of specialist consultants. This Project will respect the independence of specialists with high-level expertise by encouraging the sharing and centralization of resources for the efficient provision of health care services.

2-2-1-4 Policy on Construction and Procurement Situations

2-2-1-4-1 Construction Plan

Major construction materials will be procured in Sri Lanka. Procurement from Japan will be considered for fittings and finishing materials required for high standards for air-tightness, sanitation, chemical resistance, etc. Procurement from Japan will also be considered for electrical equipment and air-conditioning/ventilation equipment, all of which needs to be highly reliable and safe. While sanitation equipment will be procured basically in Sri Lanka, sanitary equipment for handicapped will be procured from Japan. Electrical boards and generator will be procured from third country.

The transportation route for the imported items is assumed to use Colombo Port and inland transport from there to the planned construction site.

Skilled workers and experienced engineers will be generally recruited in Colombo. The provision of temporary lodgings and other necessary measures for these engineers will be considered in the general temporary works.

2-2-1-4-2 Equipment Plan

Most of the medical equipment commonly used in Sri Lanka is made in Japan, Europe, and the U.S. The equipment procured in this Project will generally be the products of Japan and Sri Lanka. In some cases, however, items requiring spare parts or consumables and items requiring maintenance services may be procured from a third country, provided that the manufacturer has a sales agency in Sri Lanka. The transportation route will include unloading at Colombo Port and inland transport from there to the construction site in Jaffna.

2-2-1-5 Policy on the Operation and Management Abilities of the Implementing Agency

2-2-1-5-1 Facility Plan

The Facility Maintenance Department of the Hospital has an officer in charge of facility maintenance who directly oversees 9 maintenance engineers (6 pump engineers, 1 plumber, 1 carpenter, and 1 mason). Two of these engineers stay in the Hospital at night and on holidays to perform routine maintenance. The maintenance of air-conditioning facilities, the emergency generators, and sewerage treatment facilities is out-sourced to external entities. In view of this, the facilities constructed in this Project will be of a level that can be efficiently maintained and managed by the maintenance engineers of the Hospital and available external entities.

2-2-1-5-2 Equipment Plan

The Jaffna Teaching Hospital Branch of the Biomedical Engineering Service (BES), the maintenance department of the Ministry of Healthcare, Nutrition and Uva Wellassa Development (MOH) take the tasks of equipment maintenance. An engineer and 3 technicians are responsible for all medical equipment in the Hospital. Overall, however, they only perform relatively simple maintenance and repair works themselves. The more difficult repair works are entrusted to the BES headquarters in Colombo or the manufacturers' sales agencies in Sri Lanka. For this reason, most of the equipment provided through this Project will be of a level appropriate to the present maintenance capabilities. The more advanced equipment requiring complicated maintenance will be selected to fit the servicing abilities of the manufacturers' sales agencies in Sri Lanka.

2-2-1-6 Policy on the Grading of Facilities and Equipment

2-2-1-6-1 Facility Plan

Jaffna Teaching Hospital performed 24,655 operations in 2004, including 4,275 major operations, 5,132 intermediate operations, and 15,248 minor operations. Minor operations are far more frequent than major and intermediate ones. This, together with social and economic conditions in the target

area, will form the basis of the level planned for the facilities as a whole.

In grading the facilities, the basic design will refer to other medical facilities in Sri Lanka. The design standards used in this Project will basically be British Standards (BS), a type commonly applied in Sri Lanka, and some specifications will be covered by the supplementary use of Japanese Industrial Standards (JIS).

The major operations performed in 2004 included 42 neurosurgical procedures, high-level orthopedic operations such as osteotomy (about 100), and about 10 procedures involving the spinal cord. In addition, the Department of Oncology has been treating patients since December 2004 and the Department of Cardiac Surgery will be commencing treatment in the near future. These departments will require advanced operation rooms with a high degree of cleanness.

In the facilities plan, specifications meeting the requirements of advanced medical technologies will be provided in specific departments and rooms.

2-2-1-6-2 Equipment Plan

The equipment will be of the same grade as the items handled by current users. To ensure easy procurement within Sri Lanka, manufacturers with local sales agencies, will be selected for the procurement of items requiring spare parts and consumables.

2-2-1-7 Policy on Construction/Procurement Methods and the Term of Work

In planning the term of construction work, the basic design will place the highest priority on safety, paying due consideration of the current situation in Jaffna. Four checkpoints are situated along the inland transport route from Colombo, and this makes it difficult to reliably predict the time required for transportation. Thus, certain amounts of inventory will have to be secured near the construction site in order to prevent delays in the procurement of construction materials from affecting overall construction period.

Jaffna district has had few large-scale public works, hence skilled workers are in short supply. This will make it necessary to avoid specialized construction methods in the construction plan. Common construction methods will have to be used whenever possible without any sacrifices in the quality of the work.

2-2-2 Basic Plan

2-2-2-1 Building Facility Plan

2-2-2-1-1 Design Policy

The following summarizes basic policy for the building facility design:

- 1) The flow lines of the staff and those of the patients will be kept separate to ensure that large numbers of patients can be efficiently cared for by a limited number of staff.
- 2) The number of basic dimensions will be minimized to realize efficient structure and ease of construction.
- 3) Simple air-conditioning systems will be used in almost all areas to ensure that the facilities can be maintained and renewed properly by local contractors.
- 4) Electric power, city water, etc. will be installed as systems dedicated to the target building to minimize the influence on existing facilities.
- 5) Plans on circulation and facilities will closely conform with the Master Plan for the future improvement of the Hospital as a whole.

2-2-2-1-2 Departments Included in the Project

This Project will include the following departments:

Central Operation Theater (COT):	Operation rooms, septic operation rooms (for infectious cases), Recovery Rooms
Central Supply & Sterilizing Department (CSSD):	Washing, Sterilization, Clean Store
Intensive Care Units (ICU):	Internal Medicine, Surgery, Infection
Central Laboratory Complex:	Histopathology, Hematology, Biochemistry, Microbiology
Central Facilities for Diagnostic Imaging:	Radiology, Endoscope Room, Physiology Rooms (ECG, EEG, Ultrasound)
Other Rooms:	Office Rooms, Machinery Room, Etc.

As a teaching institution, the Hospital is provided with training laboratories, students' lounges, and other facilities related to medical education. With the restoration of peace in Sri Lanka, the number of medical students and their activities are expected to increase in the future. It is difficult to secure the land for horizontal expansion, as the Hospital is located in the city central area with limited

land. Thus, space for future expansion will be secured on the roof for teaching facility expansion.

2-2-2-1-3 Layout and Floor Planning

The planned construction site faces the Hospital Street. The building will be aligned in parallel with the section of the road adjacent to the premises to ensure that the building harmonizes well with the cityscape. The building plan will seek to achieve the largest area possible with this parallel orientation. The Master Plan, in contrast, has an axis along another road adjacent to the Hospital premises. The northern part of the building will be aligned to this axis to ensure consistency with the Master Plan.

2-2-2-1-4 Scale of the Project

The scale of the Project will be determined according to following data:

- The floor areas of the existing facilities of Jaffna Teaching Hospital
- Past records of practice in the existing facilities of Jaffna Teaching Hospital
- The floor areas of teaching hospitals in Sri Lanka
- Actual data on the floor areas of hospitals in Japan and other countries.

■ Operation Theater Complex

Floor Area of the Existing Facility

Room	Floor Area (m ²)
Operation room 1	57
Operation room 2	52
Operation room 3	57
Instrument Store 1	37
Instrument Store 2	37
Prep Room 1	17
Prep Room 2	17
Staff Room (including lavatory)	18
Physicians' Room (including lavatory)	21
Changing Room for Women	21
Matron's Room	33
Nurses' Room	30
Changing Room for Men	29
Anesthesiologists' Room	7
Students' Room	10
Store Room	13
Operation room 4 (Ob-Gyn)	40
Staff Room	30
Store Room	40
Nurses' Room	40
Operation room 5 (Ophthalmology)	60
Prep Room and Store Room	60
Total Effective Floor Area	726

Determination of the Number of Operation rooms

In the year 2004, the surgeons at the Hospital performed 24,655 operations. Provided that operation rooms are used 365 days per year and minor operations are performed in the Emergency Unit, at least 8 operation rooms will be needed to sustain activity at this level.

Table 2-1 Actual Number of Operations in a Year

		2004	Days/Year	Cases/Day	Expected Cases/Room /Day	No. of Needed Operation rooms	Breakdown by Department
General Surgery	Major	674	280	2.41	3	0.8024	1.53
	Int.	1,597	365	4.38	6	0.7292	
	Minor	9,256	365	25.36	15	In Emergency Dept.	
Orthopedics	Major	598	280	2.14	3	0.7119	0.95
	Int.	519	365	1.42	6	0.2370	
	Minor	5,135	365	14.07	15	In Emergency Dept.	
Gynecology	Major	310	280	1.11	3	0.3690	0.53
	Int.	287	300	0.96	6	0.1594	
	Minor	411	365	1.13	15	In Emergency Dept.	
Obstetrics	Major	2,124	365	5.82	3	1.9397	2.12
	Int.	384	365	1.05	6	0.1753	
	Minor	37	365	0.10	15	In Emergency Dept.	
Urology	Major	195	280	0.70	3	0.2321	0.42
	Int.	303	300	1.01	6	0.1683	
	Minor	115	365	0.32	15	0.0210	
Plastic Surgery	Major	33	280	0.12	3	0.0393	0.15
	Int.	185	300	0.62	6	0.1028	
	Minor	23	365	0.06	15	0.0042	
ENT	Major	103	280	0.37	3	0.1226	0.27
	Int.	204	280	0.73	6	0.1214	
	Minor	161	365	0.44	15	0.0294	
Ophthalmology	Major	109	280	0.39	3	0.1298	0.13
	Int.	54	280	0.19	6	In existing units	
	Minor	73	365	0.20	15	In existing units	
Thoracic Surgery	Major	24	280	0.09	3	0.0286	0.06
	Int.	66	365	0.18	6	0.0301	
	Minor	33	365	0.09	15	0.0060	
Cerebral Surgery	Major	42	280	0.15	3	0.0500	0.05
	Int.	9	365	0.02	6	0.0041	
	Minor	3	365	0.01	15	0.0005	
Dentistry	Major	0	280	0.00	3	0.0000	0.00
	Int.	0	300	0.00	6	0.0000	
	Minor	1	365	0.00	15	0.0002	
Contraception (LRT)	Major	63	280	0.23	3	0.0750	0.92
	Int.	1,524	300	5.08	6	0.8467	
	Minor	0	365	0.00	15	0.0000	
Total (Major)		4,275	Total No. of Operations/Day (in This Project)	30	Total No. of Operation rooms required		7.14
Total (Int.)		5,132					
Total (Minor)		15,248					
Grand Total		24,655					

Floor Area Planned

Room	No.	Floor Area (m ²)	Basis for Determination
Operation room	8	312	6 general operation rooms and 2 operation rooms for infection
Prep Room	2	72	2 independent U.K. type prep rooms
Prep Room, Infection	1	40	Machinery for postoperative washing will also be installed
Operation Hall	1	334	Open-style with prep corner, scrub corner, and space for instruments arranged conveniently in the Operation Hall
Recovery Room	1	147	For 8 beds corresponding to 8 operation rooms, including space for instruments
Nurse Station	1	20	Also used for reception work and management of the recovery rooms
Drugstore	1	12	
Anesthesiologist	1	18	
Physicians' Room	1	18	Lounge
Changing Room for Physicians	2	36	Separate rooms for men and women, each including showers, lavatory, and lockers (for 20 workers in total)
Nurses' Room	1	36	Lounge
Changing Room for Nurses	2	24	Separate rooms for men and women, each including showers, lavatory, and lockers (for 20 workers in total)
Matron's Room	1	18	
Staff Room	1	36	Lounge
Staff Changing Room	2	24	Separate rooms for men and women, each including showers, lavatory, and lockers (for 15 workers in total)
Office	1	60	The administrative office of the Operation Theater Complex, assuming about 5 office workers
Chief	1	18	
Total Effective Floor Area		1225	

■ Central Supply & Sterilizing Department

Floor Area of Existing Facility

Room	Floor Area (m ²)
Repair and Sewing	20
Store Room	10
Preparation Room	51
Sterilization Room	40
Washing Room	10
Total Effective Floor Area	131

Floor Area Planned

Room	No.	Floor Area (m ²)	Basis for Determination
Changing Room for Washing	2	24	Also used as staff lounge. To accommodate 10 staff members instead of the current 6.
Receiving Office	1	27	Reception items from the Operation department and other departments, and record keeping
Washing	1	95	Space for the washing of carts, washing of instruments, and packing
Sterilization	1	11	According to the equipment layout
Clean Store	1	53	Storage for 30 operations/day
Clean Disposable	1	11	
Clean Changing Room	2	20	Separate rooms for men and women, assuming 6 workers in total

Room	No.	Floor Area (m ²)	Basis for Determination
Clean Issue	1	18	Issuance of sterilized instruments and sterilized disposables to other departments
Total Effective Floor Area		259	

■ Intensive Care Units

Floor Area of Existing Facility

Room	Floor Area (m ²)
ICU, Surgery (4 beds)	63
Prep Room	9
Lounge	14
Chief	15
Store Room	12
ICU, Internal Medicine (6 beds)	94
Store Room	43
Nurses' Lounge	15
Chief	10
Counseling	10
Medical Gas Room	10
Total Effective Floor Area	295

Determination of the Number of ICU Beds

The occupancy rate of beds is 100% for the 4 beds in the ICU for surgery and the 6 beds in the ICU for internal medicine. Ordinarily the patients in the observation beds in the Emergency Unit should be moved to the ICU within 24 hours. As things stand, however, they often remain in the Emergency Unit for nearly a week due to the full occupancy of the ICUs. According to experience, ICU beds should make up 2% of the total number of beds in the Hospital. As the Hospital currently has 1,100 beds, an ICU with 22 beds would meet this requirement (1,100 beds x 2% = 22 beds).

Floor Area Planned

Room	No.	Floor Area (m ²)	Basis for Determination
ICU	1	360	12 beds for internal medicine and 8 for surgery (20 in total). All beds are to be located in 1 room for efficient management.
ICU, Infectious	2	24	2 beds in separate rooms
Nurse Station	1	30	Central monitoring and recording
Preparation	1	12	Clean preparation
Sluice	1	10	
Linen Store/Storage	1	25	Linens, instruments, and disposables for 22 beds
Guests' Changing Room	1	9	Gowning room for the family entering the ICU
Nurses' Room	1	18	
Physicians' Room	2	36	2 physicians, internal medicine, and surgery
Changing Room	2	24	Separate rooms for men and women
Total Effective Floor Area		619	

■ **Central Laboratory Complex**

Floor Area of Existing Facility

Room	Floor Area (m ²)
Biochemistry 1	74
Biochemistry 2 (Histology)	74
Microbiology	99
Hematology	74
Histopathology	74
Training Laboratory	60
Office	24
Darkroom	10
Technicians' Room	49
Chief	24
Staff Room	19
Washing	24
Lounge	58
Total Effective Floor Area	663

Floor Area Planned

Room	No.	Floor Area (m ²)	Basis for Determination
Laboratory Clinical Pathology Hematology Biochemistry Microbiology Urinalysis Washing	1	330	Apart from microbiology lab, the laboratory is designed integrally as a single room in order to enhance the efficiency of the flow lines of the laboratory technicians. The efficient layout of instruments in the planned area will enable a reduction in the overall area compared with the existing facility (a reduction from 395 m ² to 336 m ²). Including 2 washing rooms
Blood Collection	2	24	2 rooms (one for men and one for women)
Urine Collection	2	24	2 rooms (one for men and one for women)
Reception Office	1	8	
Chief	1	18	
Office	1	40	Existing number of laboratory technicians: 10. Used as working room for office work, for taking records, and as a lounge
Counseling	1	12	Used for multiple purposes, including patient counseling and worker meetings
Meeting Room	1	41	Training is conducted in the laboratory (no dedicated training laboratory is provided). Accordingly, a meeting room is provided for basic lectures on laboratory tests. This meeting room can be used for multiple purposes. Tables arranged in a box shape can accommodate 24 persons.
Storage	1	8	
Sluice	1	8	
Pantry	1	8	
Operation Preparation	1	16	Staircase room directly leading to Operation Dept.
Total Effective Floor Area		537	

■ **Central Facilities for Diagnostic Imaging**

Floor Area of Existing Facility

Room	Floor Area (m ²)
General Radiology 1	30
General Radiology 2	30
General Radiology & Dental X-ray 3	33
Darkroom 1	33
Darkroom 2 / Working Room	30
Ultrasound Room (2 booths)	33
Ultrasound Room (in separate building)	36
ECG Room (in separate building), 2 units	36
ECG, Stress Testing (in separate building)	36
EEG (in separate building)	24
EEG Prep Room (in separate building)	24
Endoscope Room (2 booths) (in separate building)	36
Endoscopy Prep Room (in separate building)	36
CT Room	33
CT Operation Room	33
CT Machinery Room	33
Office & Reception	33
Chief	33
Nurses' Lounge	64
Staff Lounge	49
Staff Changing Room	30
Instrument Store	33
Disposables Store	10
Total Effective Floor Area	768

Determination of the Number of Rooms Based on Actual Performance of Radiological Examinations

Monthly average from January to June 2004: 6,747 films/month

Assuming 3 films per patient in average: $6,747/3 = 2,249$ pts/month

Assuming 15 minutes per person: $2,249 \text{ pts} \times 15 \text{ min} = 562.25$ hours/month

Work hours in a week: 8:00 to 16:00 (7 hours/day) on weekdays, 8:00 to 12:00 (4 hours/day) on weekends

Hence, $7 \times 5 \text{ days} + 4 \times 1 \text{ day} = 39$ hours/week, 156 hours/month

Number of needed X-ray units: $562.25 \text{ hours}/156 \text{ hours} = 3.60$ units → 4 units

Floor Area Planned

Room	No.	Floor Area (m ²)	Basis for Determination
Radiology	4	120	The number of units will be increased by 1 according to the above calculation. One of the 4 units will be a fluoroscopy unit (to be housed in a room large enough to accommodate equipment).
Changing Room for Radiology	8	24	2 changing booths will be provided for each radiology room to improve the efficiency of examination.

Room	No.	Floor Area (m ²)	Basis for Determination
Dental X-ray	1	18	Minimal space needed for installation of equipment
Mammography	1	20	Minimal space needed for installation of equipment
CT Room	1	60	Existing equipment will be relocated at the expense of the recipient. The partitioning of the CT operation room and machinery room will also be conducted at the expense of the recipient.
Endoscope Room	2	32	Separate rooms for men and women, as in the existing facility
Endoscopy Prep Room	1	30	Used for recording, washing, and storage
Physiology Room, 8 booths EEG ECG Ultrasound	1	170	8 booths in total, as in existing facility. Booths will be used instead of separate rooms, chiefly in order to facilitate management by limited numbers of persons. This arrangement will allow flexible modification when the number of units increases in the future.
Physiology Prep Room	1	36	Work preparation, recording, and storage
Darkroom	1	18	
Viewing Room	1	36	Including storage
Staff Room	1	36	Lounge for staff
Reception Office	1	36	Recording and sorting of patient charts, general reception work, etc.
Reception	1	18	Counter style
Chief	1	18	
Instrument Store	1	18	
Counseling	2	24	Multiple purposes, including patient counseling, department meetings, lectures to students, etc.
Office	1	36	
Total Effective Floor Area		750	

■ Other Rooms

Planned Area

Room	No.	Area (m ²)	Basis for Determination
Generator Room	1	120	Emergency generator and low-tension receiving facility
Medical Gas Machinery Room	1	48	Gas cylinder storage and pump room for compressed air and aspiration
Water Pump & Fire Pump	2	36	Fire pump is housed in a separate partition.

				Elevated Water Tank
4th Floor 30 m ²	(Space for Future Expansion of Rooms for Medical Education)		Space for Air Conditioner Outdoor Units	Generator
3rd Floor 2,070 m ²	Operation Dept. Management Room	ICUs 20 ICU beds 2 Rooms for infections	Central Laboratory Complex Clinical Pathology, Hematology, Biochemistry, Microbiology	
2nd Floor 2,200 m ²	Operation Theater Complex 8 Operation rooms (incl. 2 for aseptic), Recovery Rooms		Central Supply & Sterilizing Dept. 4 sterilizers	
1st Floor 2,370 m ²	Central Facilities for Diagnostic Imaging 4 Radiology Rooms, Dental X-ray, Mammography Endoscopy Room, CT Room Physiology Room (8 booths, ECG, EEG, Ultrasound)		Machinery Room, etc.	
Total Floor Area 6,870 m ²				Water Reservoir, etc.

Fig. 2-1 Outline of Facilities by Floor Level

2-2-2-1-5 Vertical and Cross-sectional Plans

Many of the existing buildings were constructed in the colonial period. The high ceilings of these buildings secure sufficient air space, providing a comfortable room environment without the use of air conditioning. The cross-sectional plan for this Project will set a standard floor height of 4.8 m and high direct ceilings to ensure sufficient natural ventilation. The larger air space in rooms with high ceilings generally limits the efficiency of air conditioning. Though air conditioning is to be used in many rooms in this Project, it will only be used for cooling. Thus, the cooling efficiency can be improved by limiting the coverage of cooling to the spaces used by human beings and locating cool air outlets at a height of about 2.4 m. Ceiling boards will be used in clean areas such as operation rooms, and the space above ceiling boards will be used for ducts for efficient air conditioning and ventilation. As this Project covers central health care functions, the room partitioning is likely to require alteration in the future as medical technologies advance. A building with insufficient floor height would have little flexibility for such alteration and require frequent reconstruction, a process that would shorten the social service life of the building. The use of the standard floor height of 4.8 m will therefore be effective for prolonging the social service life.

Due to the relationship with existing buildings of the Hospital, the rooms requiring air conditioning, such as the operation rooms and ICUs, will be located along the southern face of the building. To reduce the air-conditioning load in these rooms, the vertical surface facing the south will be protected from direct sun by the use of lattice-type louvers. While the northern face also receives sunlight due to the low latitude, the waiting areas for families (open-corridor type) will be located

along the northern face to protect the air-conditioned rooms behind.

The exterior finish of the building will be cement paint, a type which local workers can easily repair.

2-2-2-1-6 Construction Material Plan

The main finishing materials will basically be selected from among the materials available in Sri Lanka. This will enable maintenance and repair by local workers.

Table 2-2 Finishes for the Main Rooms

	Room	Floor	Skirting	Wall	Ceiling
3F	Laboratory	Epoxy poured flooring	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Blood Collection	Epoxy poured flooring	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Urine Collection	Asphalt waterproofing, covering concrete, 150 square tiles		150 square wall tiles up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Chief	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Office	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Counseling	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Meeting Room	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	ICU	Epoxy poured flooring	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Prep Room	Asphalt waterproofing, covering concrete, 150 square tiles	Tiles	150 square wall tiles up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Sluice	Asphalt waterproofing, covering concrete, 150 square tiles		150 square wall tiles up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Linen store/warehouse	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Nurses' Room	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Physicians' Room	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Changing Room	Asphalt waterproofing, covering concrete, 150 square tiles		150 square wall tiles up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint, paint finish on exposed pipes
Chief	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint	
Office	Asphalt waterproofing, covering concrete, 150 square tiles		Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint	
2F	Operation Room	Epoxy poured flooring	Tiles	Vinyl paint	Waterproof plaster board, joint-less finish, vinyl paint
	Operation Hall	Epoxy poured flooring	Tiles	Vinyl paint	Waterproof plaster board, joint-less finish, vinyl paint
	Recovery Room	Epoxy poured flooring	Tiles	Vinyl paint	Waterproof plaster board, joint-less finish, vinyl paint

	Room	Floor	Skirting	Wall	Ceiling
	Nurse Station	Epoxy poured flooring	Tiles	Vinyl paint	Waterproof plaster board, joint-less finish, vinyl paint
	Drugstore	Epoxy poured flooring	Tiles	Vinyl paint	Waterproof plaster board, joint-less finish, vinyl paint
	Anesthesiologists' Room	Epoxy poured flooring	Tiles	Vinyl paint	Waterproof plaster board, joint-less finish, vinyl paint
	Matron	Epoxy poured flooring	Tiles	Vinyl paint	Plaster board, joint-less finish, vinyl paint
	Nurses' Room	Asphalt waterproofing, covering concrete, 150 square tiles		Vinyl paint up to dado height of 2100, ready mixed paint above	Plaster board, joint-less finish, vinyl paint
	Clean Corridor	Epoxy poured flooring	Tiles	Vinyl paint	Waterproof plaster board, joint-less finish, vinyl paint
	Changing Room for Washing	Asphalt waterproofing, covering concrete, 150 square tiles		150 square wall tiles up to dado height of 2100, ready mixed paint above	Waterproof plaster board, joint-less finish, vinyl paint
	Washing	Asphalt waterproofing, covering concrete, 150 square tiles		150 square wall tiles up to dado height of 2100, ready mixed paint above	Waterproof plaster board, joint-less finish, vinyl paint
	Receiving Office	Asphalt waterproofing, covering concrete, 150 square tiles		150 square wall tiles up to dado height of 2100, ready mixed paint above	Waterproof plaster board, joint-less finish, vinyl paint
	Clean Store	Epoxy poured flooring	Tiles	Vinyl paint	Waterproof plaster board, joint-less finish, vinyl paint
	Clean Changing	Asphalt waterproofing, covering concrete, 150 square tiles		150 square wall tiles up to dado height of 2100, ready mixed paint above	Waterproof plaster board, joint-less finish, vinyl paint
	Clean Issue	Epoxy poured flooring	Tiles	Vinyl paint	Waterproof plaster board, joint-less finish, vinyl paint
1F	Radiology	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	CT Room	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Endoscope Room	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Physiology Room	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Physiology Prep Room	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Darkroom	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Viewing Room	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Plaster board, joint-less finish, vinyl paint
	Office	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Plaster board, joint-less finish, vinyl paint
	Chief	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Waiting Room	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
Common	Lavatory	Asphalt waterproofing, covering concrete, 150 square tiles		150 square wall tiles up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint, paint finish on exposed pipes
	Corridor, etc.	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint
	Waiting room	150 square floor tiles	Tiles	Vinyl paint up to dado height of 2100, ready mixed paint above	Direct ceiling, ready mixed paint

2-2-2-1-7 Structure Plan

1) Outline of the Structure

This building is planned as a medical facility. The following outlines the building structure:

- Number of floors : 4 stories above ground
- Floor height : 4.8 m
- Standard span : 6.0 m x 6.0 m
- Type of structure : Reinforced concrete rigid frame structure, brick walls
- Foundation : Spread footing (spot footing)

2) Foundation Plan

According to the geological survey report, the ground of this site consists of solid limestone at depths of 2.0 m and below and clayey sand mixed layers deposited near the surface. Cementation has occurred in the sandstone layer from just above the limestone to a depth of about 1.5 m. The strength of this layer (the cemented sandstone layer) falls between that of the two layers. According to the result of an on-site plate-bearing test and data in the literature, this layer has a long-term allowable bearing capacity of 250 kN/m². To optimize economic performance, the new building in this Project will use spread footing (spot footing) into this cemented sandstone layer. The space under the 1st floor is to be used for piping installation. In order to assure adequate maintenance and future expansion, the beams supporting the 1st floor (footing beams) will be floated above the ground to make sufficient space for (see the figure below).

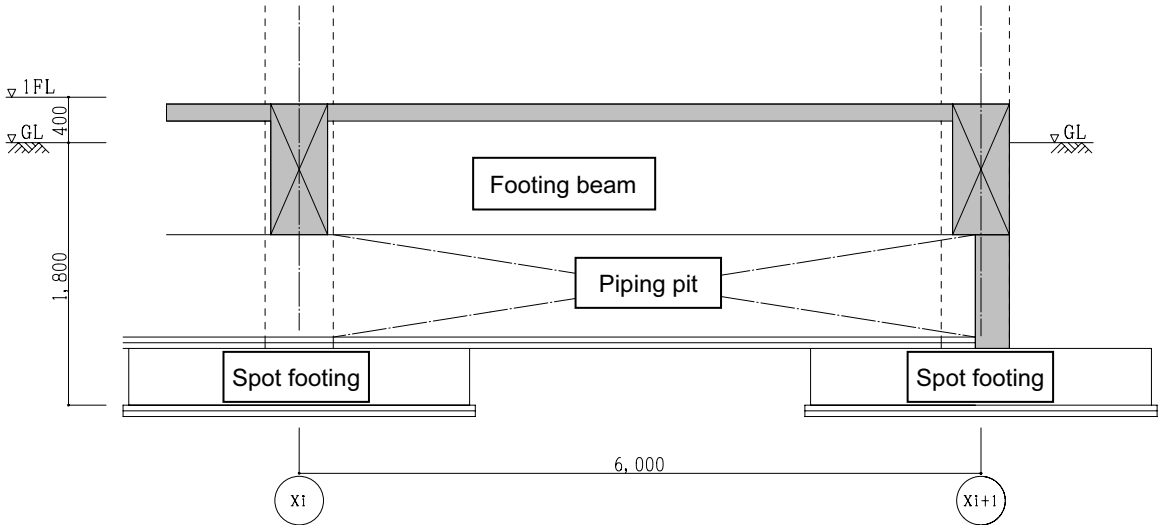


Fig. 2-2 Conceptual Drawing of Piping Pit

3) Superstructure Plan

Considering the standard span of this building, the superstructure of this building will be a reinforced-concrete rigid-frame structure. Generally speaking, a span of 5 to 6 m is appropriate for reinforced concrete structures and a span of 6 to 9 m is appropriate for steel-framed structures. While the 6 m span in this building is suitable for both types of structures, the reinforced-concrete rigid-frame type is more suitable for specific features of the planned construction site. Local contractors also have more experience in working with this type of structure.

4) Load and External Force

- Live load: The live load allowance of each room is defined according to the Building Code Law of Japan. The live load allowance of the main rooms is as shown below.

Office:	3000N/m ²	Radiology room:	3000N/m ²
Operation room:	4000N/m ²	Machinery room:	5000N/m ²
Lavatory:	1800N/m ²	Rooftop (for future expansion):	3000N/m ²

- Load from Earthquakes

The project area is affected by few natural disasters and has no past records of earthquakes. Accordingly, load from earthquakes is not considered in this Project.

- Wind Load

While cyclones strike in the southern parts of Sri Lanka, they are extremely rare in Jaffna City. Thus, the wind load is calculated according to Article 87 of the Building Code of Japan. The standard wind velocity V_0 is set at 30 m/s.

5) Major Construction Materials

Concrete: For design, $F_c=21 \text{ N/mm}^2$
For construction, $F_c=27 \text{ N/mm}^2$
(21 N + 3 N for fluctuation allowance + 3 N for work quality;
Correction for variability in quality will be considered separately
based on actual performance.)

Steel bars: $f_t=345\text{N/mm}^2$

2-2-2-1-8 Electrical Facility Plan

1) Power Receiving Facility

As with the existing sub-station, a dedicated incoming line will be branched from the special high-voltage overhead distribution line of the Ceylon Electric Board (CEB) running along the Hospital Street facing the Hospital. An H-shaped private pole will be placed in an open section of land between the existing sub-station (Sub-station No. 1) and the Hindu temple, and a section switch will be installed on the pole.

2) Power Supply Facility

- Special High-voltage Receiving Facility

As with the existing sub-station, an outdoor ground-based open-type sub-station (Sub-station No. 2) will be newly constructed under the H-shaped private pole. The main switchboard will be a standalone cubicle type, installed outdoors adjacent to the sub-station. This sub-station will subsequently supply low-voltage power to the facilities in this Project. Fences around the outdoor sub-station will be made to prevent entry of intruders. The power supply meters of CEB will be installed in the outdoor stand-alone cubicle.

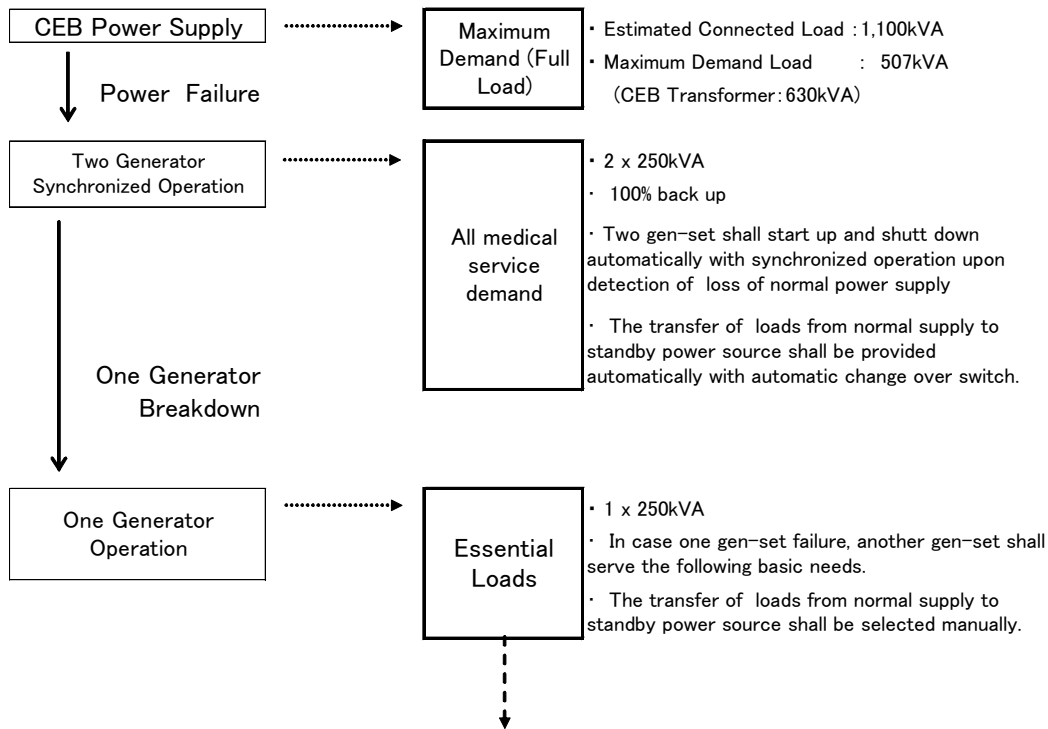
- Main Power Supply Facility

Electric power will be supplied from the low-voltage panel board to the lighting distribution switchboard and power control board on each floor via electric power shafts. The main voltage will be 3-phase 4-line 415/240 V, 50 Hz. An alarm display board will be installed in the administration office to monitor abnormal conditions in the water reservoir, elevated water tank, pumps, power substation, transformer, emergency generators, etc.

- Emergency Power Generation Facility

A diesel generator system will be installed as an emergency power supply to ensure that minimal central health care functions are maintained during power breaks, which occur almost daily in Jaffna City. The emergency generators will be installed in the generator room. The unit will be an indoor low-noise type with vibration insulation. The service tank will have enough capacity to sustain ongoing operation for about 12 hours. A space for storing fuel in drums will be provided outside the generator room.

Two generators shall be provided. Generator system shall be designed so that in case one generator fails, power supply to essential loads such as life supporting equipments, will be continued from the other operational generator.



		Load selection under One Generator Operation			
		Lighting (GC)	Medical Equipment	HVAC	Power Supply
Whole Building		○			
Operation Theater	A~H (8rooms)	○	○	○	
Intensive Care Unit	20+2 beds	○	○		
Laboratory		○	○	○	
Fire Fighting Pump					○
Lift	2 nos.				○

○ : Applicable
 (GC) : under generator circuit

• Automatic Voltage Regulator (AVR)

The measurement in the Hospital using a recording voltmeter during the Basic Design Study indicated voltage fluctuations exceeding 10% every day: AC 208-232 V on the 1st day, AC 238-215 V (1 power failure) on the 2nd day, and AC 239-216 V (1 power failure) on the 3rd day (see the measurement results in the figure below).

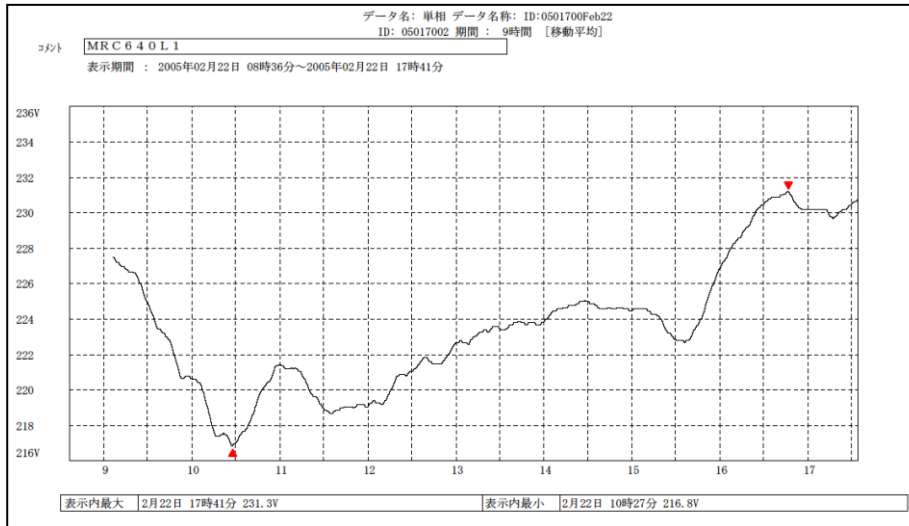


Fig. 2-3 Record of voltage measurement

Data name: Single phase Data identification: ID:0501700Feb22
ID:05017002 Period: 9 hours [moving average]
Comment MRC640L1
Period displayed: From 08:36 Feb 22, 2005 to 17:41 Feb 22, 2005
Max. in display 17:41 Feb 22 231.3V
Min. in display 10:27 Feb 22 216.8V

Therefore, an automatic voltage regulator (AVR) will be installed in the low-voltage main line to prevent troubles of medical equipment. In addition, portable uninterruptible power sources (UPSs) will be provided individually for medical equipment susceptible to malfunction due to sudden power failure. These UPSs will be covered in the medical equipment procurement package.

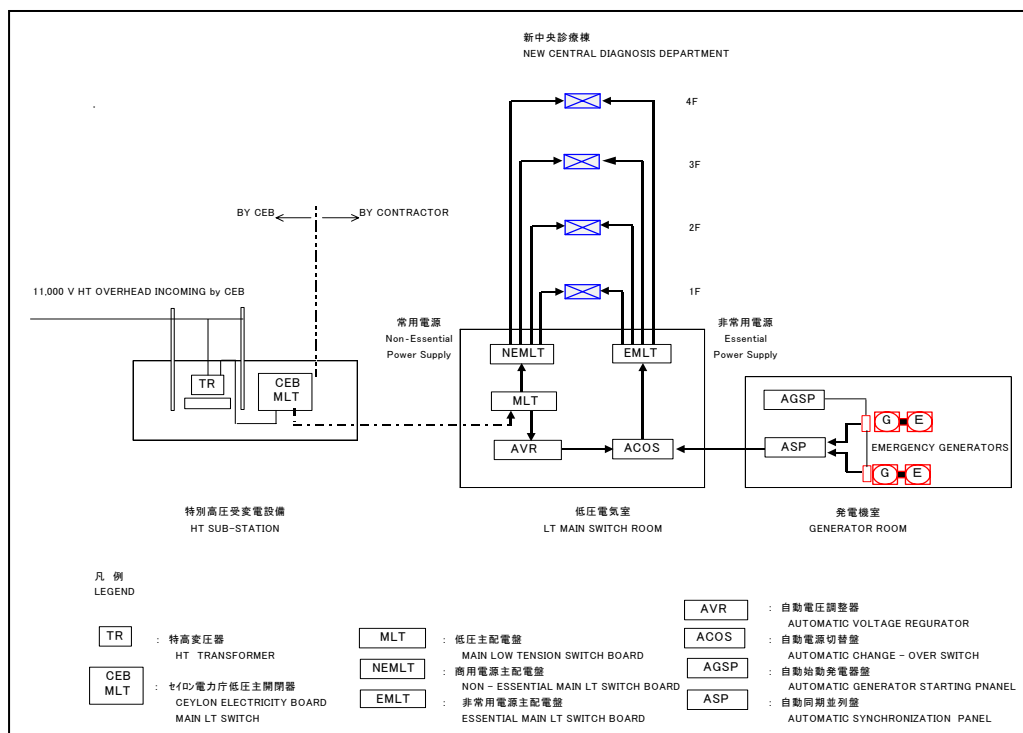


Fig. 2-4 Mains Power System Diagram

Table 2-3 Calculation of Power Demand

Power Supplied To	Expected Installed Capacity	Expected Rate of Demand	Max. Power Demand	Remark
Medical Equipment	210 kVA	15 %	31.5 kVA	X-ray units, 210 kVA
	360 kVA	40 %	144 kVA	
Air-conditioning/ Ventilation Facilities	280 kVA	80 %	224 kVA	
Water Supply, Drainage & Sanitation Facilities	60 kVA	20 %	12 kVA	
Lighting facilities	110 kVA	80 %	88 kVA	
Receptacles	30 kVA	20 %	6 kVA	
Other Loads	10 kVA	20 %	2 kVA	
Firefighting Facilities	30 kVA	0 %	0 kVA	
Total	1,100 kVA		507.5 kVA	

3) Lighting and Receptacle Facilities

A lighting distribution switchboard will be installed on each floor with an appropriate circuit configuration. Conduit wiring for secondary circuitry will run from the switchboard to the lighting fixtures and receptacles.

- Lighting Facilities

General lighting: Lighting fixtures mainly using fluorescent lamps will be selected. The circuitry will be designed to facilitate power saving by separating into small groups to enable individual control.

Special lighting facilities: Shadowless lamps in operation rooms and other medical lighting equipment will be included in the medical equipment works.

Emergency lighting facilities: Battery-powered wall-mount emergency lighting equipment will be provided in rooms which accommodate people.

Exit lights: Battery-powered light guide plate-type pictograph exit lights will be installed.

Table 2-4 Intensity of Illumination in the Main Rooms

Room	Intensity of Illumination
Operation room	750 lx
Examination room & laboratory	500 lx
Office	300 lx
Radiology room	200 lx
Lavatory, changing room, & instrument store	150 lx
Corridor & waiting room	100 lx

- Receptacles

Receptacles for general use will be 13A receptacles with switches and grounding terminals. The power sources for medical equipment will be configured to meet the required power capacity considering the equipment layout. The receptacles receiving the backup from the emergency generator will be identified by red plates.

4) Public Address Facilities

A main public address equipment will be installed. This will facilitate paging of physicians, emergency evacuations, announcements, etc.

5) Interphone Facilities

Dedicated interphone systems will provide telephone linkage between the Operation rooms and related rooms (i.e., the Nurse Station, CSSD, Physicians' Lounge, and Anesthesiologists' Room) and between the Radiology Rooms and related rooms (i.e., the equipment operation console in the corridor, Changing Room, Waiting Room, and Darkroom). A nurse-call interphone system will be installed between ICUs and Nurse Station.

6) Telephone Facilities

Telephone sets will be installed in the rooms that require telephones for the operation of the facilities. Existing general telephone lines are considered sufficient for use in the new building. Telephone cables will be installed from the telephone exchange room in the existing building (ENT CLINIC) to the main distribution frame (MDF) in the new building, in sufficient numbers to service the numbers of telephone extensions required. Conduit wiring will then be run from the MDF to the terminal board on each floor, and from there to the telephone outlets. In addition, an empty conduit for future data networks will be installed from the MDF to the external wall of the building. This conduit will provide a route for feeding in the new line from Sri Lanka Telecom (SLT).

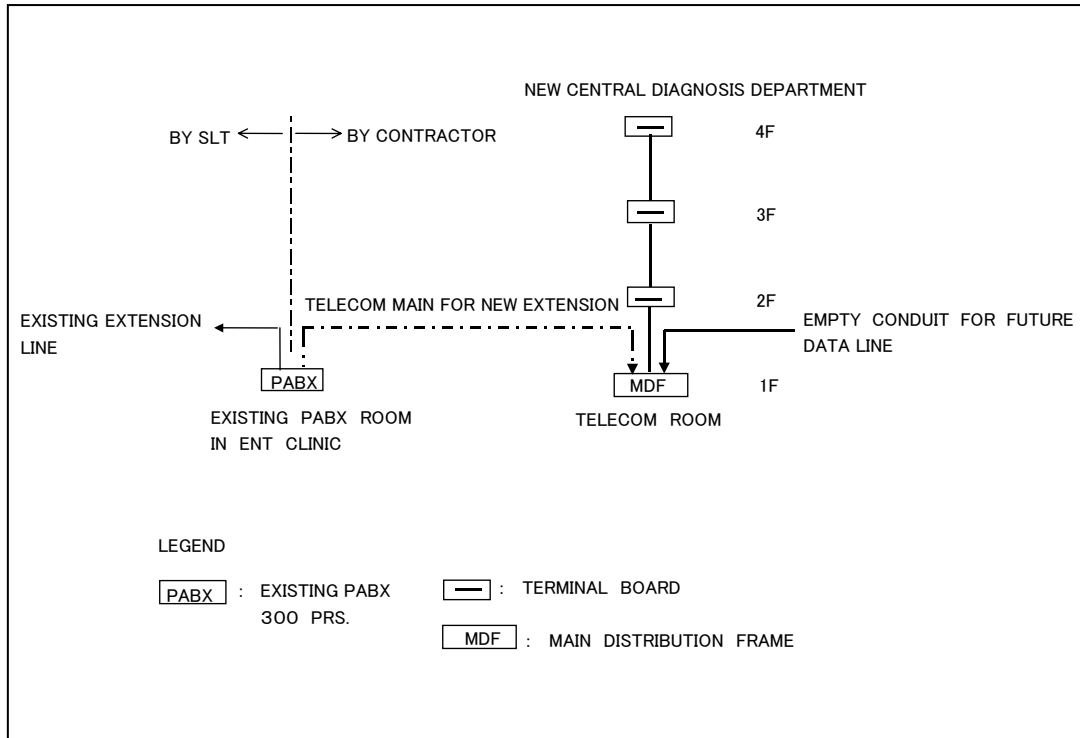


Fig. 2-5 Main Telephone Line System

7) Automatic Fire Alarm Facilities

A fire alarm system will be installed as required by ordinance of the Jaffna City Fire Department (1989). The basic design will use Japanese fire codes as a reference when planning the system in areas where no detailed local standards apply.

8) Conduits for Computer Network

To allow for future connection via computer network (LAN), a conduit will be installed from the shaft on each floor to the vicinity of the rooms requiring LAN. The various devices and cables required for the computer network will not be covered under the Project.

9) Lightning Protection Facility

This will be installed for lightning protection of the elevated water tank using specifications according to BS 6651 (British Standard Code of Practice for Protection of Structures Against Lightning).

10) Grounding of Medical Equipment

Grounding facilities will be installed for operation rooms and for X-ray units.

1) Air Conditioning Facilities

Operation rooms will be equipped with air-cooled, package-type, floor-standing, direct-flow air conditioners. Air cleaner units will be installed to maintain cleanness. The target level of cleanness will be class 10,000.

Other medical care rooms will be equipped with individual air-cooled, split-type air conditioners.

Office rooms will have ceiling fans only.

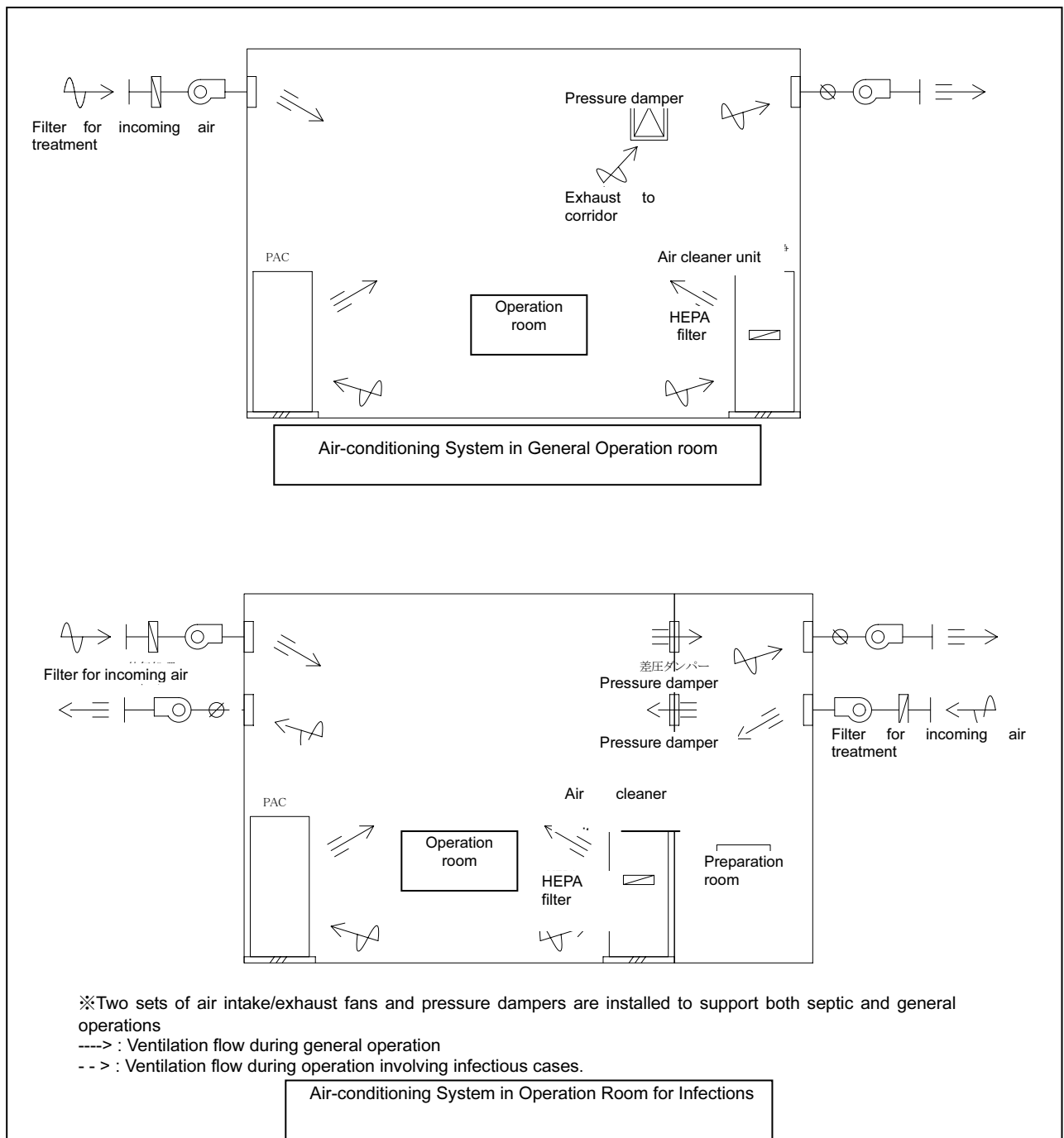


Fig. 2-6 Conceptual Drawing of Air-conditioning Systems

2) Ventilation Facilities

General offices and public areas will be equipped with ceiling fans.

Each operation room will have an independent ventilation system to prevent cross contamination between rooms. In addition, a pressure damper will be installed in clean area rooms to maintain positive pressure and ensure cleanness. In the rooms for the treatment of patients with infections, however, the room will be kept under negative pressure to prevent the leakage of harmful contaminated air.

Mechanical ventilation will also be equipped in storage, sluice, toilets, etc.

3) Sanitation Facilities

Appliances complying with local customs will be installed. Hand showers will be installed.

4) Water Supply Facilities

Rainwater and city water will be used as tap water for general uses such as hand washing. Well water will be used as non-potable water for uses such as toilet flushing.

- Tap Water

The rainwater collected on the roof of the building and city water will be the water source.

To maintain the quality of rainwater, rain falling on wall surfaces and ground surfaces will not be used as a water source. City water will be taken from the city water mains buried under the road to the south of the premises and stored in the water reservoir. A water softener will also be installed, as water quality tests conducted during the Basic Design Study showed that the city water has high hardness.

The water stored in the water reservoir will be pumped up to the elevated water tank and then supplied to points of use by gravity. This water will be sterilized using a UV sterilizer to maintain the cleanness required for the central health care functions of the Hospital.

- Non-potable Water

The existing well will be used as the source of non-potable water. Because direct water supply from the well to the elevated water tank will affect adversely the supply to existing buildings, the well water will be stored in the water reservoir in the same manner as tap water. The water will be pumped up to the elevated water tank and then supplied to points of use by gravity.

The materials used will be PVC pipes. Galvanized steel pipes will be used for pumping the water up to the elevated water tank.

- Estimated Water Supply

The estimated water supply in this facility is estimated as follows:

Persons in the facility:

Workers	About 150 persons (120 L/day/person)
Outpatients (including attendants)	About 1,500 persons (15 L/day/person)

Daily water supply:

$$150 \text{ persons} \times 120 \text{ L/day/person} + 1,500 \text{ persons} \times 15 \text{ L/day/person} \doteq 40,000 \text{ L/day} \\ (40 \text{ m}^3/\text{day})$$

As this Project involves two water supply systems, tap water and non-potable water, the water supply must be calculated for each of these systems. According to Air Conditioning and Sanitation Technology Handbook (13th Edition), the ratio between tap water and non-potable water in a hospital is generally in the range of 60-66% : 40-34%. As this Project has no kitchens, however, the ratio is assumed to be 50 : 50. In this case, the quantity of water supply for each system will be as follows:

Tap water:	$40 \text{ m}^3/\text{day} \times 0.5 \doteq 20 \text{ m}^3/\text{day}$
Non-potable water:	$40 \text{ m}^3/\text{day} \times 0.5 \doteq 20 \text{ m}^3/\text{day}$

- Reservoir Capacity

Tap water reservoirs in Japan usually have a capacity equal to about 50% of the water quantity supplied daily. The tap water reservoir in this Project will have a capacity equal to 100% of quantity supplied daily, in view of the unstable supply of city water.

The reservoir for non-potable water will also have a capacity equal to 100% of the quantity supplied daily.

Tap water reservoir (underground pit)	20 m ³ (effective capacity)
Non-potable water reservoir (underground pit)	20 m ³ (effective capacity)

- Elevated Water Tank Capacity

The capacity will be equal to about 20% of water quantity supplied daily.

Elevated water tank for tap water (made of concrete;)

$$5 \text{ m}^3 \text{ (effective capacity)} \\ 20 \text{ m}^3/\text{day} \times 0.2 \doteq 5 \text{ m}^3, \text{ dimensions: } 2.5 \text{ m} \times 2.5 \text{ m} \times 1 \text{ m (H)}$$

Elevated water tank for non-potable water (made of concrete;)

$$5 \text{ m}^3 \text{ (effective capacity)} \\ 20 \text{ m}^3/\text{day} \times 0.2 \doteq 5 \text{ m}^3, \text{ dimensions: } 2.5 \text{ m} \times 2.5 \text{ m} \times 1 \text{ m (H)}$$

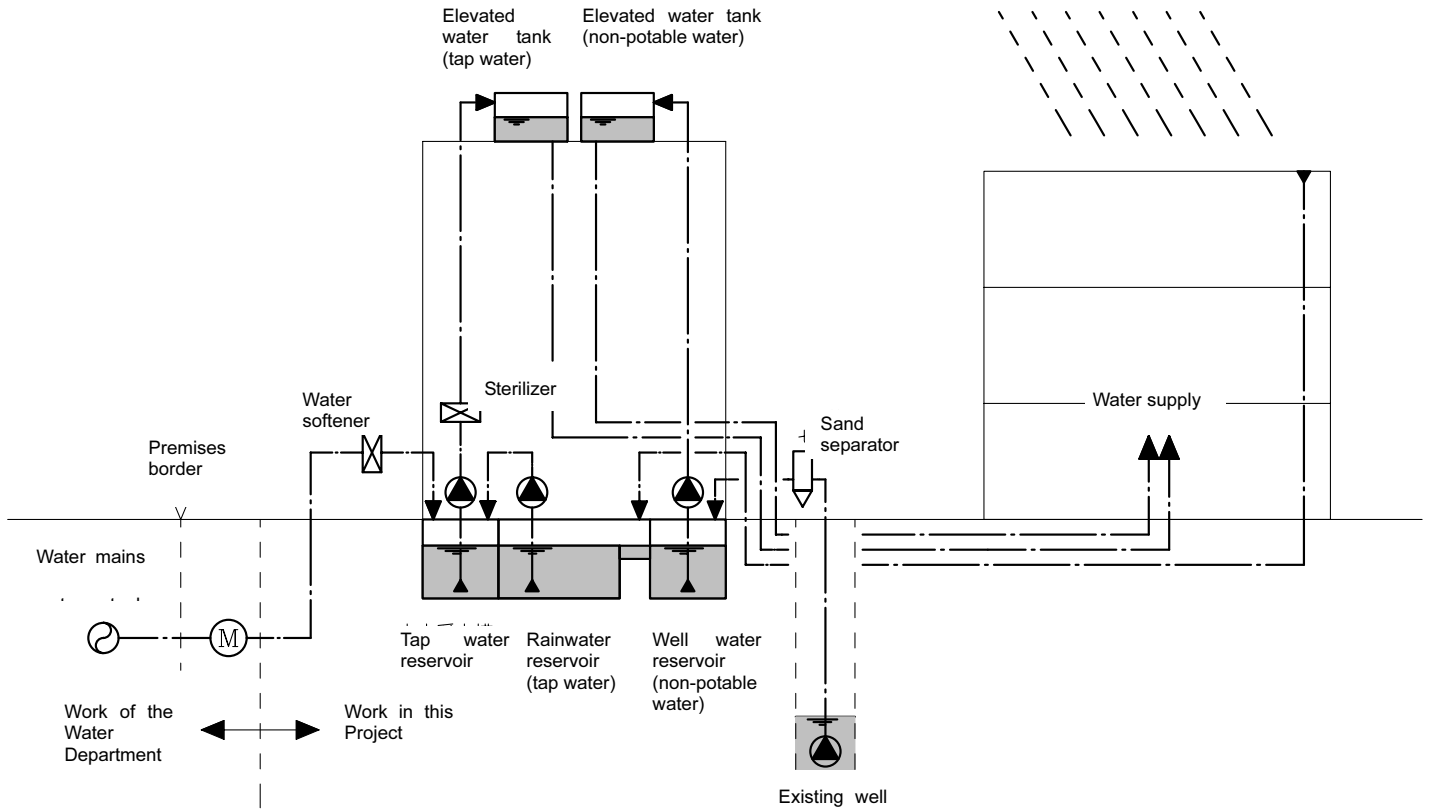


Fig. 2-7 Water Supply Flow Chart

5) Drainage Facilities

- Wastewater

Wastewater discharged from each building of the present facility is treated at the Hospital's dedicated wastewater treatment plant, a facility located about 1.5 km from the premises, and then discharged into the lagoon. The results of the water quality tests conducted during the Basic Design Study were favorable. The BOD and COD removal rates of this plant are about 85% and 70%, respectively, and the discharge quantity at present is 120 m³/day.

If the discharge from the new building is treated at the existing purification plant, the load will increase by about 30 m³/day, assuming that about 80% of the water supplied will be discharged.

In this scenario, the water quality after treatment will be as follows:

$$\text{BOD: } 292 \text{ mg/L} * (120+30) / 120 * (1-0.85) \doteq 55 \text{ mg/L}$$

$$\text{COD: } 330 \text{ mg/L} * (120+30) / 120 * (1-0.70) \doteq 125 \text{ mg/L}$$

Thus, the discharge water quality standards of Sri Lanka will be satisfied. Based on the above result, domestic wastewater from the new building will be connected to the existing collection tank on the premises and treated at the existing wastewater plant.

Laboratory wastewater and infectious wastewater will be connected to this wastewater system

after neutralization treatment and sterilization treatment, respectively. The capacity of each tank will be about the same as the daily discharge quantity. The neutralization tank will also receive wastewater from the general wastewater system in order to mix the laboratory water with general wastewater for dilution and neutralization (due to the pH differential between these two types of wastewater).

- Capacity of the Sterilization Tank

$$3 \text{ hand scrub units} * 25 \text{ L/use} * 2 \text{ uses/h} * 10 \text{ h} = 1.5 \cong 2 \text{ m}^3$$

- Capacity of the Neutralization Tank

$$9 \text{ sinks} * 25 \text{ L/use} * 0.5 \text{ use/h} * 10 \text{ h} = 1.5 \cong 2 \text{ m}^3$$

Chemicals from X-ray film developer, fixer, etc. will be collected at the source in containers.

Ventilation within the building will be achieved using circuits and vent pipes. PVC pipes will be used as the piping materials.

- Rainwater

All rainwater not collected for use will be discharged directly to the ditch along the road (Hospital Street) to the south of the premises.

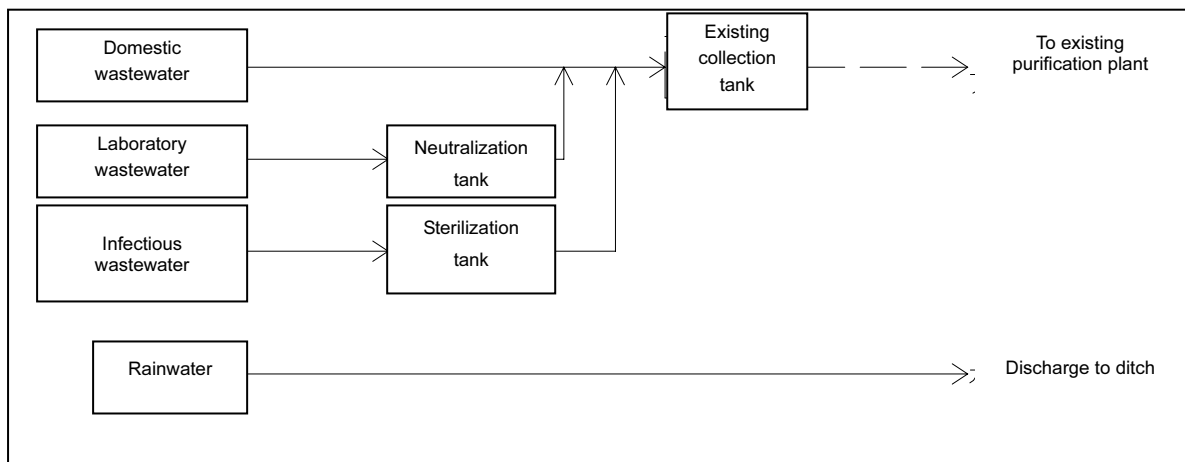


Fig. 2-8 Drainage Flow Chart

6) Hot Water Supply Facilities

Solar water heating panels will be installed on the rooftop of the building to supply hot water to points of use.

7) Firefighting Facilities

Indoor fire hydrants and connected water supply pipes will be installed.

- Capacity of the Firefighting Water Tanks

$$18.2 \text{ m}^3/\text{floor} \times 4 \text{ floors} \doteq 72.8 \text{ m}^3$$

The fire department connection will be installed on the boundary wall facing the road to the south of the premises. Two sets of firefighting pumps will be provided in total, as advised by the Fire Department of Jaffna City. Fire extinguishers will be placed on each floor.

8) Medical Gas Facilities

Centralized gas piping facilities for oxygen, nitrous oxide, compressed air, and vacuum will be installed.

The outlets currently used in the hospital employ the diameter-indexed safety system complying with British Standard (BS). The same type will be used in this Project.

Table 2-5 Medical Gas Installation Plan

	Oxygen (O ₂)	Nitrous Oxide (N ₂ O)	Vacuum	Compressed Air	Scavenging	LPG	
Operation room	○	○	○	○	○	×	Installed on walls and ceiling
Preparation room	○	○	○	○	○	×	Installed on walls and ceiling
Recovery room	○	×	○	×	×	×	1 set/bed
ICU	○	×	○	×	×	×	1 set/bed
Laboratory	×	×	×	×	×	○	8 outlets

9) Incinerator Facility

The existing incinerator (made in 2000; combustion temperature of 800°C or more) will be used as is in good operation condition.

10) Well Facility

The existing well (diameter 5 m, depth 8 m) will be used.

11) Other

The autoclaves to be procured for the Central Supply & Sterilizing Department will be package-type units with electric steam boilers. Accordingly, no central steam boilers will be installed.

2-2-2-2 Equipment Plan

2-2-2-2-1 Policy on Equipment Selection

The following policy will govern the selection of equipment related to this Project.

- (1) This Project basically covers the renewal of existing equipment and replenishment of equipment in short supply.
- (2) The level of the equipment should be compatible with the current technical level of the recipient.
- (3) Equipment with low maintenance cost should be selected.
- (4) Equipment providing high cost effectiveness should be selected.

2-2-2-2-2 Examination of the Contents of the Request

In List of the Equipment attached to Minutes of Discussions on Basic Design Study, the components of requested equipment were assigned three graded priorities in descending order: A, B, and C. Items with priority C were deemed to be inconsistent with the aforementioned policy on equipment selection and therefore excluded. Items with priority A and B were examined based on the medical activities of each department. This examination focused on consistency with the Facility Plan (in terms of the grade and quantity of equipment), as well as evaluation of the following points. Table 2-6, "Examination of Requested Equipment," summarizes the results of this examination for each item examined.

1) Classification

- i) Renewal: Items procured for renewal of existing equipment.
- ii) New: Newly procured items of a type not previously used in the existing departments.
- iii) Addition: Items similar to existing equipment which have been procured to replenish existing equipment.

2) Equipment Selection Criteria

- i) Examination of Purpose of Use
 - : Basic equipment suitable for the activities of the target facility.
 - △: Equipment that can be replaced by simpler alternatives; equipment that should be considered separately from the request.

×: Equipment unsuitable for the activities of the target facility.

ii) Examination of Need

○: Equipment considered indispensable for the activities of the target facility.

×: Equipment not strongly required for the activities of the target facility and with limited benefit; equipment whose main functions can be provided by existing equipment.

iii) Examination of Technical Level

○: Equipment compatible with the current technical level.

×: Equipment requiring a high degree of technical skill which may be difficult to acquire in the future.

iv) Examination of Operating Organization

○: The facility already has or is expected to have personnel to operate the equipment.

×: The facility is not expected to have the personnel to operate the equipment.

v) Examination of Maintenance System

○: The equipment can be maintained easily and appropriately by current personnel. The manufacturer provides appropriate maintenance services, or expendable supplies and spare parts are easily available locally.

×: The equipment is difficult to maintain and the maintenance burden is expected to cause problems after introduction of the equipment. Equipment requiring expendable supplies and spare parts which are difficult to procure locally.

vi) Examination of Operation and Maintenance Cost

○: The equipment requires only low operation and maintenance costs, or the renewal of existing equipment will not impose a heavy burden in the budget allocation on the Sri Lankan side.

×: New or added equipment requires high operation/maintenance cost and is expected to impose a heavy burden in budget allocation.

vii) Overall Evaluation

○: Equipment considered appropriate and covered by the Project.

×: Equipment not included in the Project.

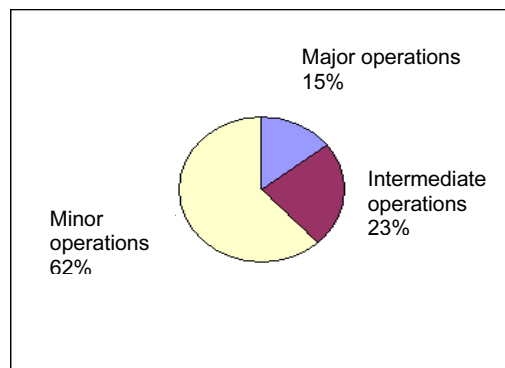
Appendix 7 “Examination List of Requested Equipment,” presents the results of this examination for each item examined. The final “Planned equipment list” and “Detail for Main Equipment” are also included in the appendices. (See “Appendix 8 - Planned equipment list” and “Appendix 9 -

Detail of Main Equipment”)

2-2-2-2-3 Examination of Equipment for Each Department

1) Operation Theater Complex

The Operation Theater Complex will have 8 operation rooms in total. Consequently, the quantities of equipment will basically be suitable for the number of operation rooms planned. This will include 8 operation tables: 7 general use and 1 for orthopedic type procedures. The types of operation to be performed are important factors for planning. About 60% of operations in the existing facility are minor and the remaining 40% are either major or intermediate operations requiring the use of general anesthesia, as shown in the figure below.



Source: Table of operations performed from 2002 to 2004.

Fig. 2-9 Scale of Operations in Jaffna Teaching Hospital

To accommodate these circumstances, the anesthetic apparatuses will include 4 units with ventilators and 4 without units. The electrosurgical units will include 4 complete units and 4 simple units. One operation shadowless lamp and one operation patient monitor will be provided for each operation room. While several types of operation instrument sets were requested, sets similar to those purchased by the Hospital in 2003 are excluded from the plan. The plan also excludes furniture, simple carts, laundry carts, and other items which are manufactured and sold in Sri Lanka and procurable within the budget of the Hospital.

2) Intensive Care Units (ICUs) and Recovery Rooms

Plans call for a total of 22 ICU beds. One patient monitor will be needed for every bed. Though some of the existing patient monitors are relatively new, they cannot be connected to the central monitor to be installed in the ICU nurse station. Thus, all of the monitors called for in the Project will be newly procured. The existing units, in turn, can be moved to recovery rooms, where patient monitors have been requested (hence, the patient monitors requested for use in the recovery rooms are excluded from the Project). The Project calls for only 9 ventilators in the

ICUs, including 7 for adults and 2 for pediatric cases. This is considered sufficient, as some ICU patients remain capable of spontaneous respiration. The newer respirators now on hand in the existing facilities can be used in the recovery rooms or moved back to the ICUs when the 9 newly procured units fail to satisfy the need. In the recovery rooms, the Project plan calls for the procurement of stretchers in place of full-sized beds. This will help reduce the number of patient movements and improve the efficiency of use.

3) Central Supply & Sterilizing Department

Sterilization at the existing facilities is performed using 3 autoclaves (2 large and 1 medium sized) purchased secondhand by the Hospital with its own budget. Over time, these aging autoclaves have been increasingly susceptible to breakdowns, failures, and a poor low availability rate. These units will be renewed, as it will be impossible to continue using them in the future. Two units of a type comparable to the 2 existing large units will be procured. The Project plan also calls for the installation of hot water disinfectors for instruments in areas adjacent to operation rooms for infected patients in order to prevent primary and secondary infections of other patients and medical staff. This is deemed to be urgently necessary, as Sri Lanka is situated in a tropical region with a high prevalence of infectious diseases.

4) Central Laboratory Complex

The Central Laboratory Complex to be renewed under the Project will conduct laboratory tests in clinical pathology, hematology, biochemistry, and microbiology.

Many items used in the existing laboratory department are decrepit and in ill repair. The equipment to be procured under the Project for tests in clinical pathology will be of a manually operated type rather than automatic, as the former can be far more easily maintained.

5) Central Facilities for Diagnostic Imaging

i) Radiology Rooms

Jaffna Teaching Hospital is the only hospital in the northern region capable of performing radiological diagnosis. For this reason, the 1 fluoroscopy X-ray system (out of order), 2 simple bucky stand X-ray systems, and CT units now equipped in the radiology unit are constantly operated to their full capacity and fail to sufficiently meet the needs of the Hospital. As stated in the determination of the scale of facility design, 4 sets of equipment for radiological diagnosis are required. Accordingly, the plan calls for the procurement of 3

simple bucky stand X-ray systems and 1 fluoroscopy X-ray system. Breast cancer screening is unavailable in the Jaffna District and the rest of the northern region, as no mammography units are on hand. In view of the rising incidence of breast cancer, the Project calls for the procurement of a new mammography unit.

ii) Physiology Room

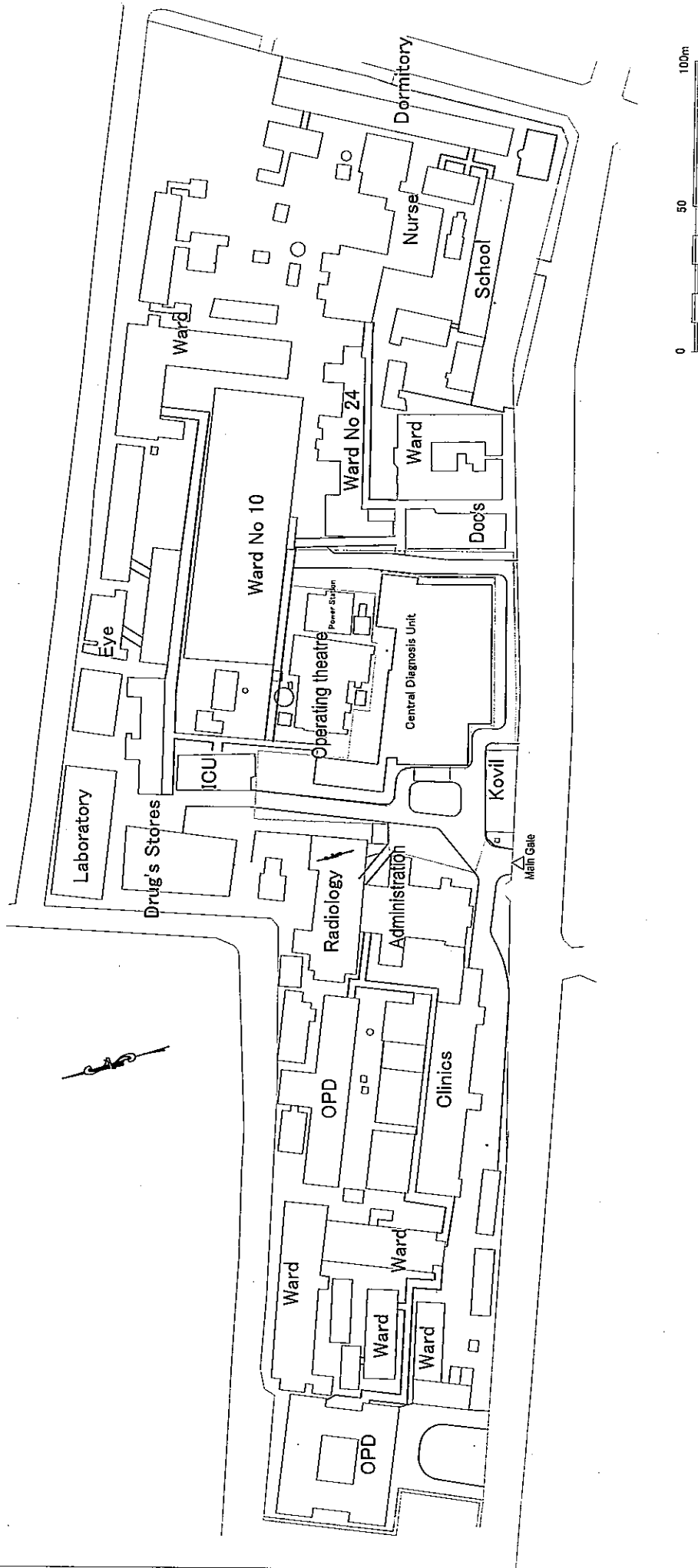
Physiological test facilities in the existing Hospital include ECG and EEG rooms. Many patients undergo examinations, as the Jaffna Teaching Hospital is the only hospital in the northern region capable of performing these tests. The Project calls for the renewal of the equipment used for these tests due to the poor working condition of the equipment on hand. Two new ultrasound scanners will also be procured to replace older unreliable units.

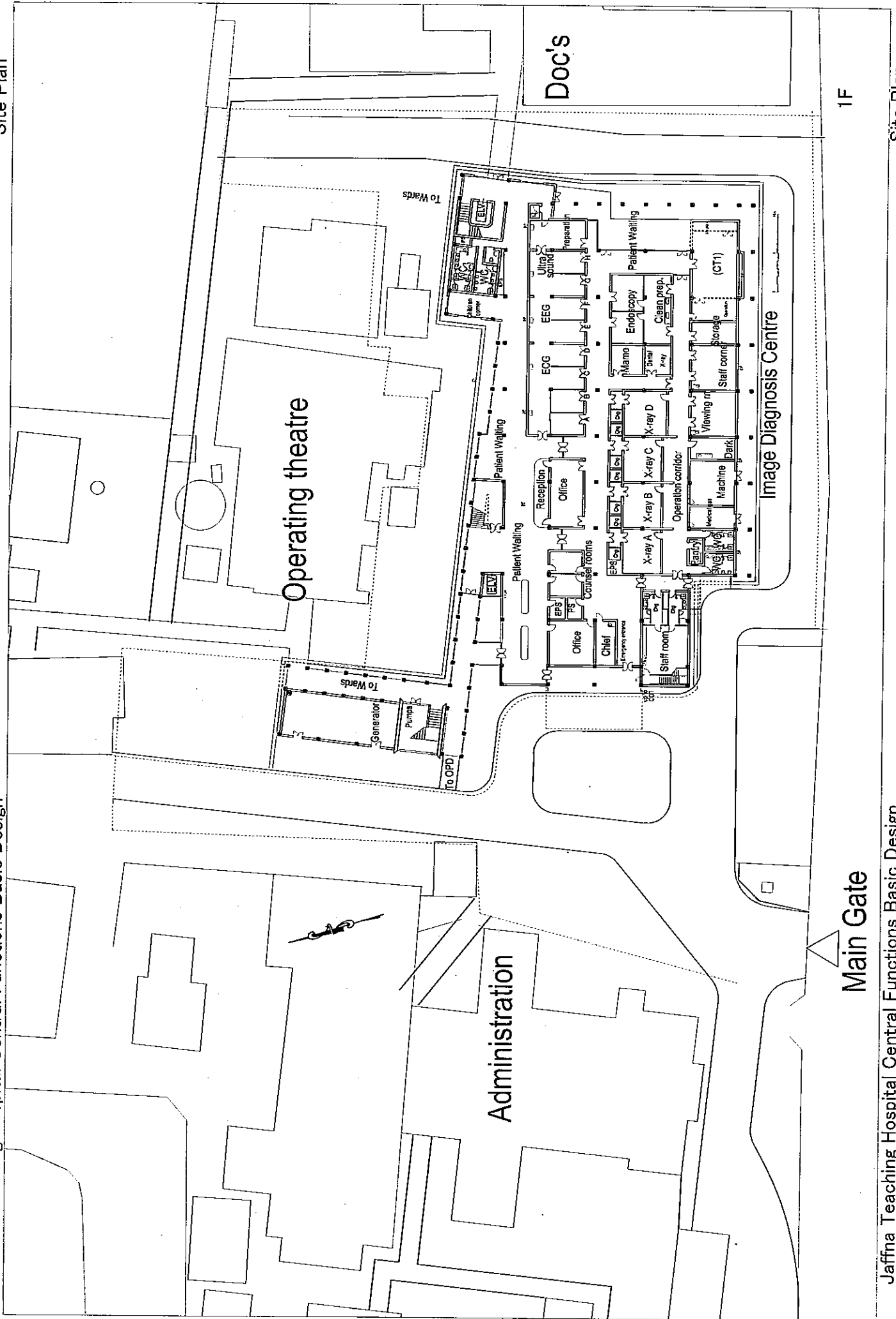
iii) Endoscopy

Similarly, Jaffna Teaching Hospital is the only hospital in the northern region that performs endoscopy, an examination which many patients require everyday. The aging equipment in the existing facility will be renewed.

2-2-3 Basic Design Drawings

1. Hospital Plan
2. Site Plan
3. 1st Floor Plan
4. 2nd Floor Plan
5. 3rd Floor Plan
6. 4th Floor Plan
7. Pit Floor Plan
8. Elevations
9. Elevations
10. Sections
11. Future Plan





Main Gate

1F

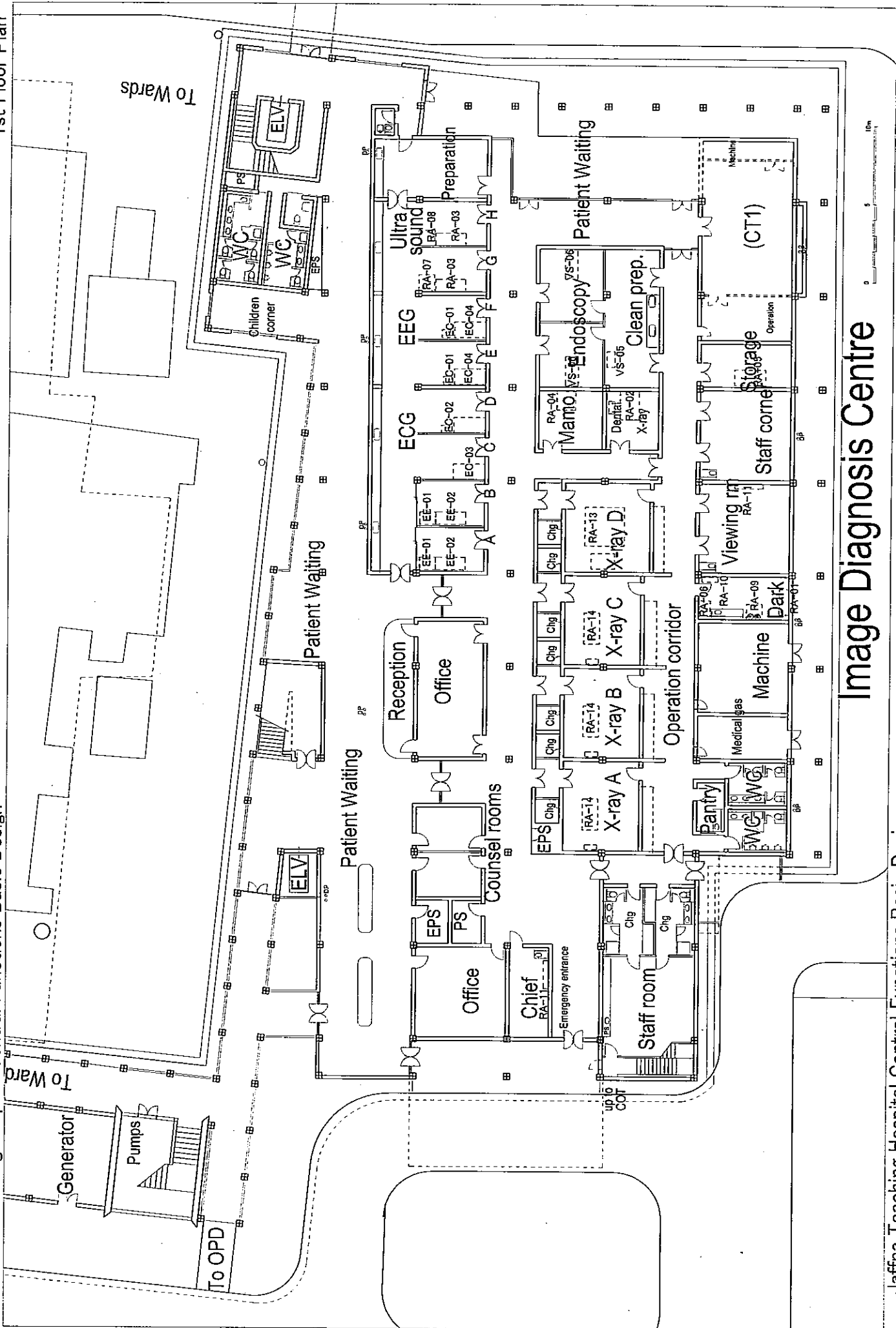
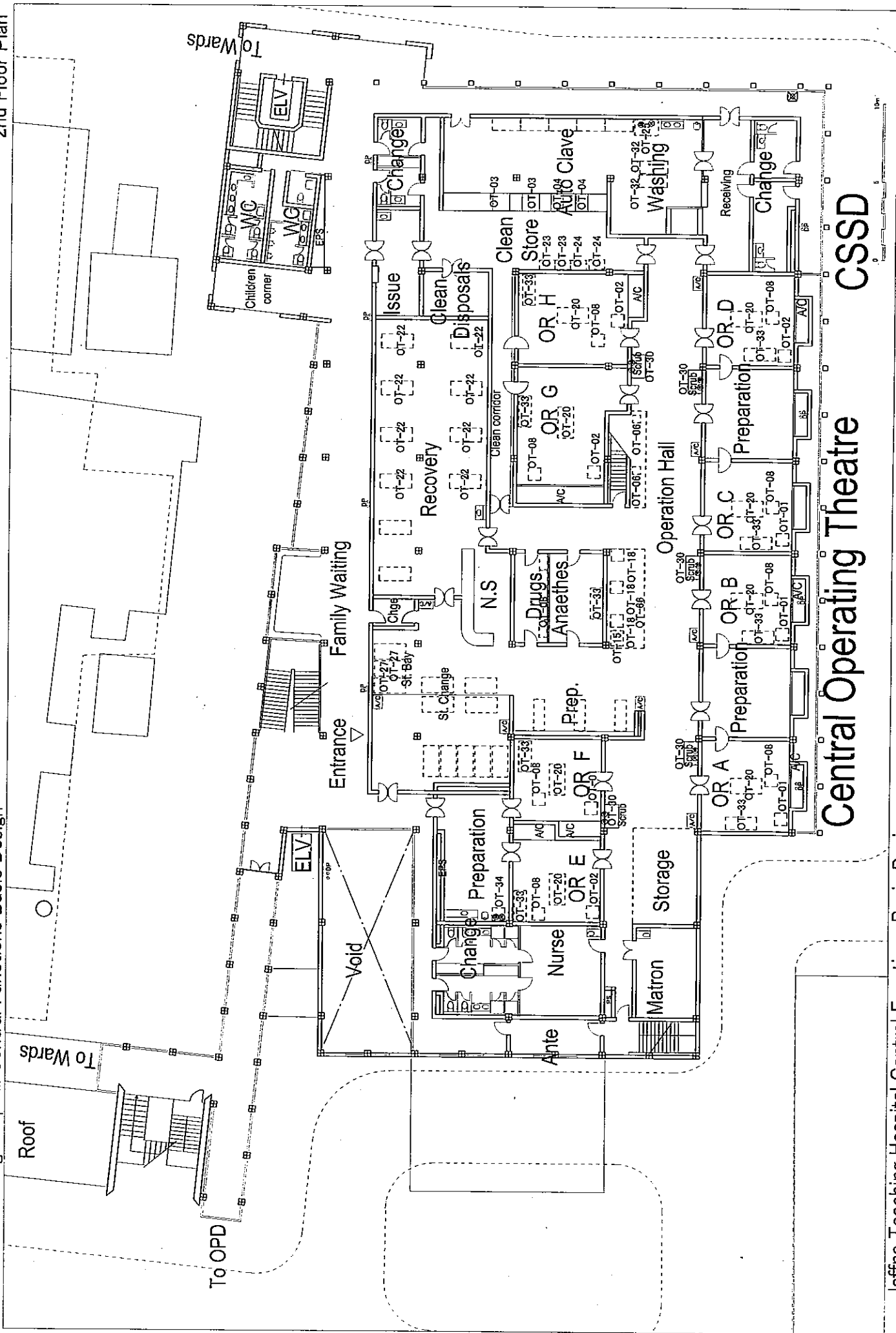
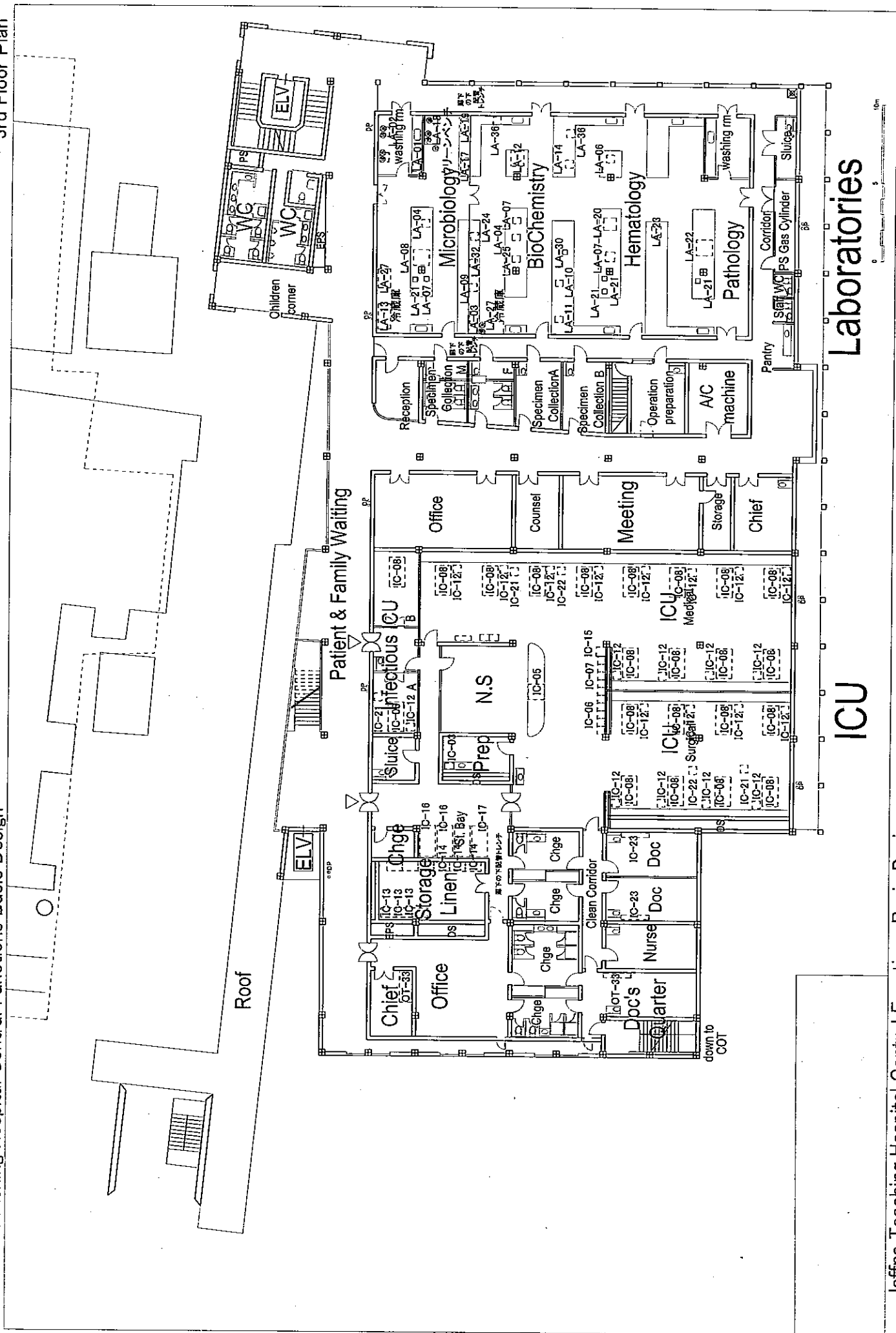
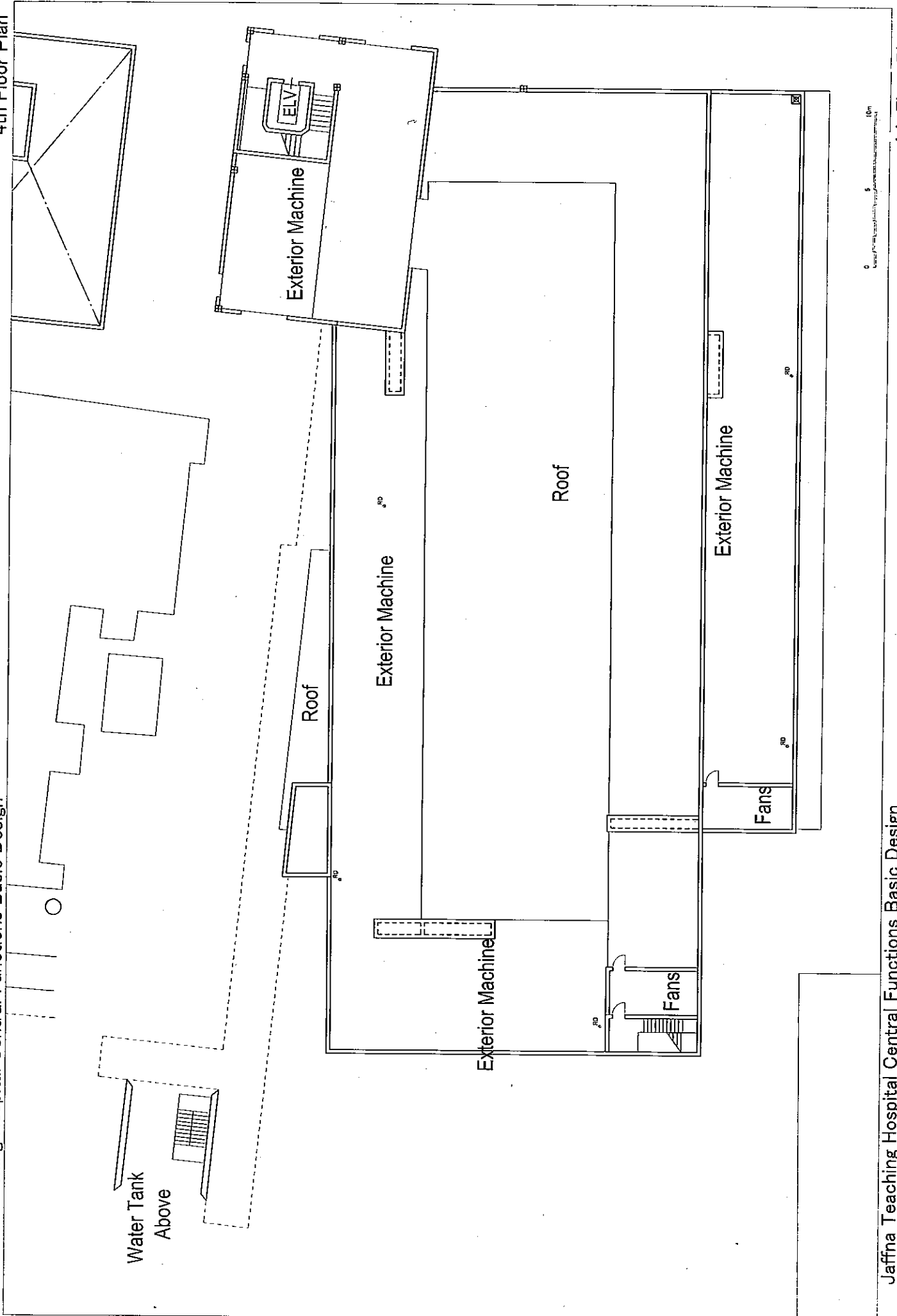


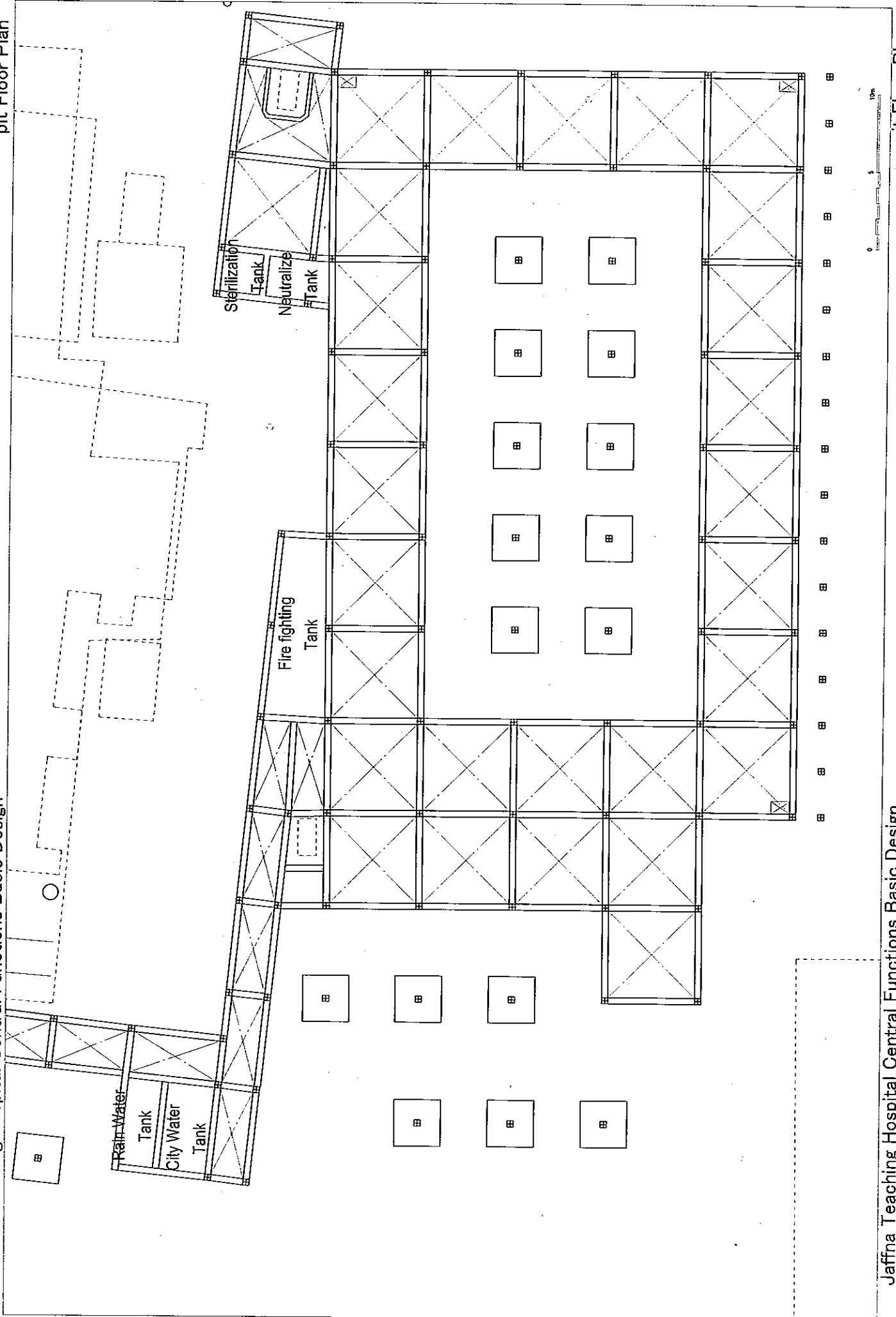
Image Diagnosis Centre

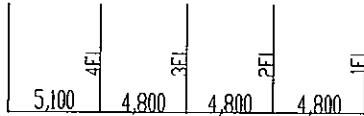
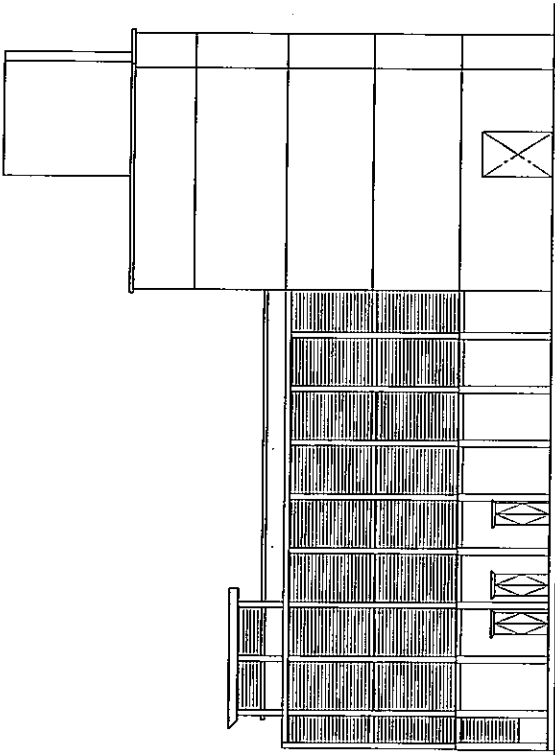


Central Operating Theatre CSSD

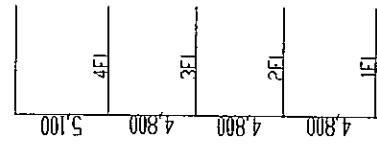
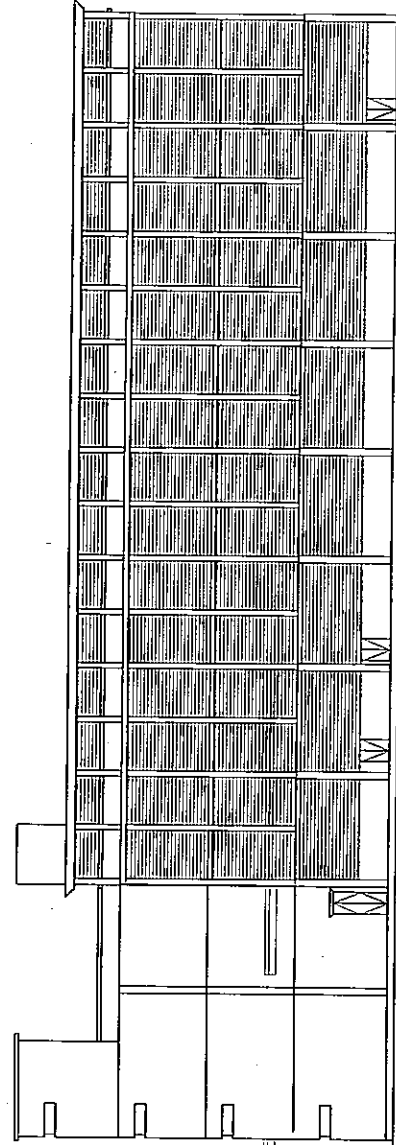




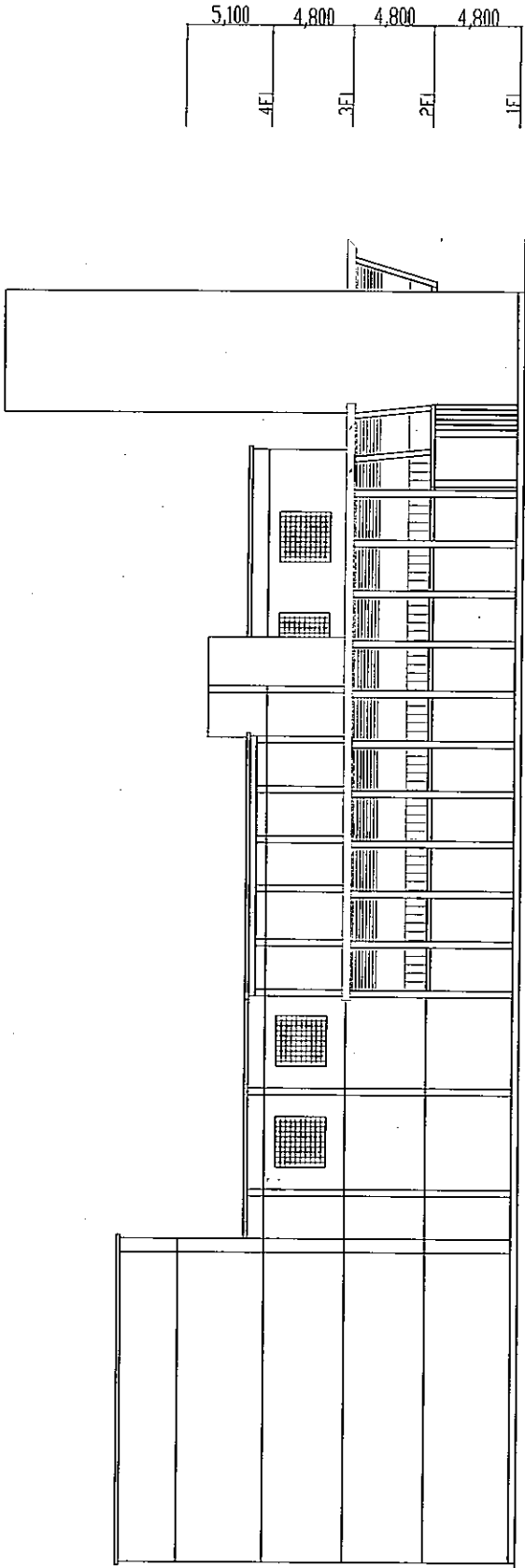




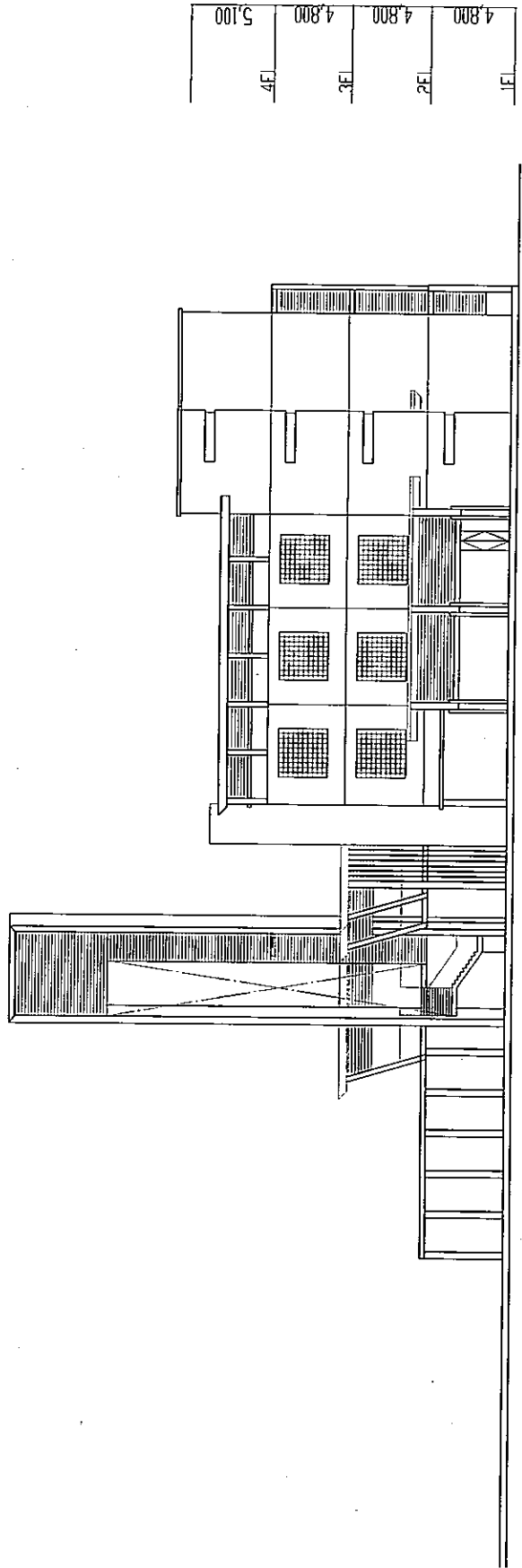
East Elevation



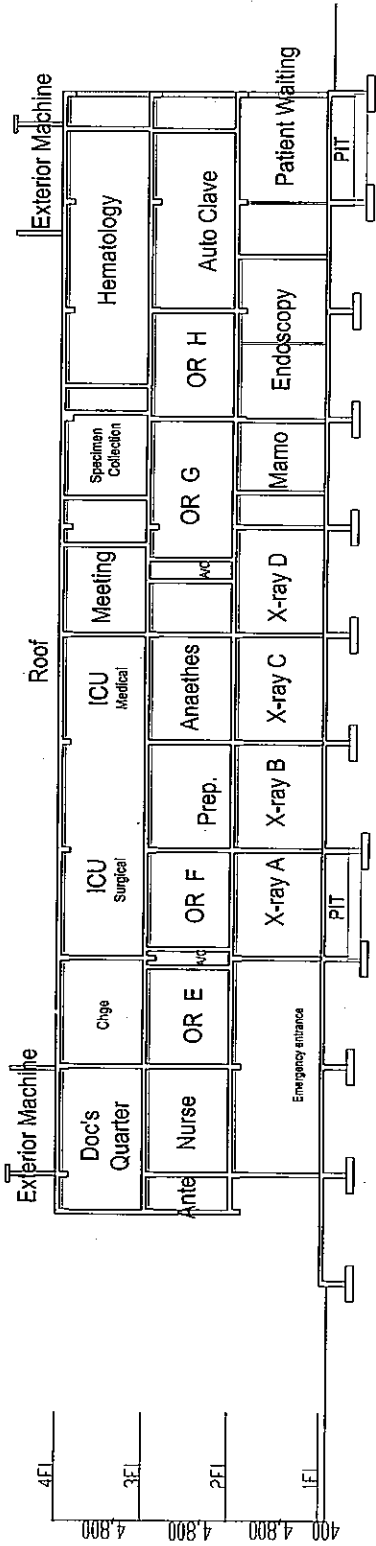
South Elevation



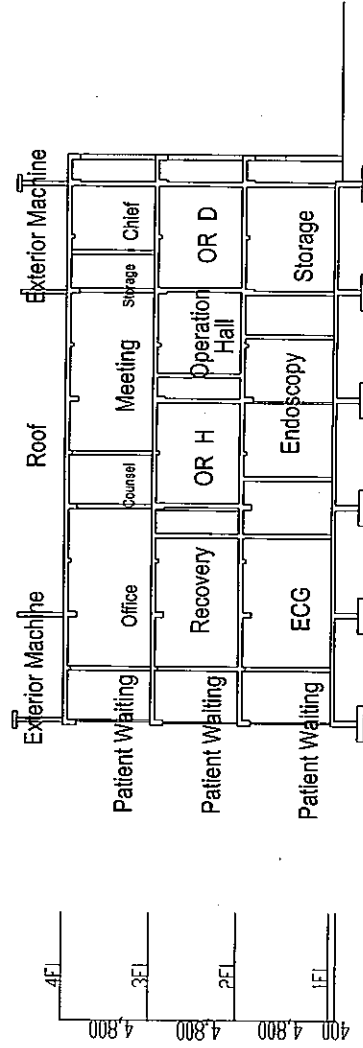
North Elevation



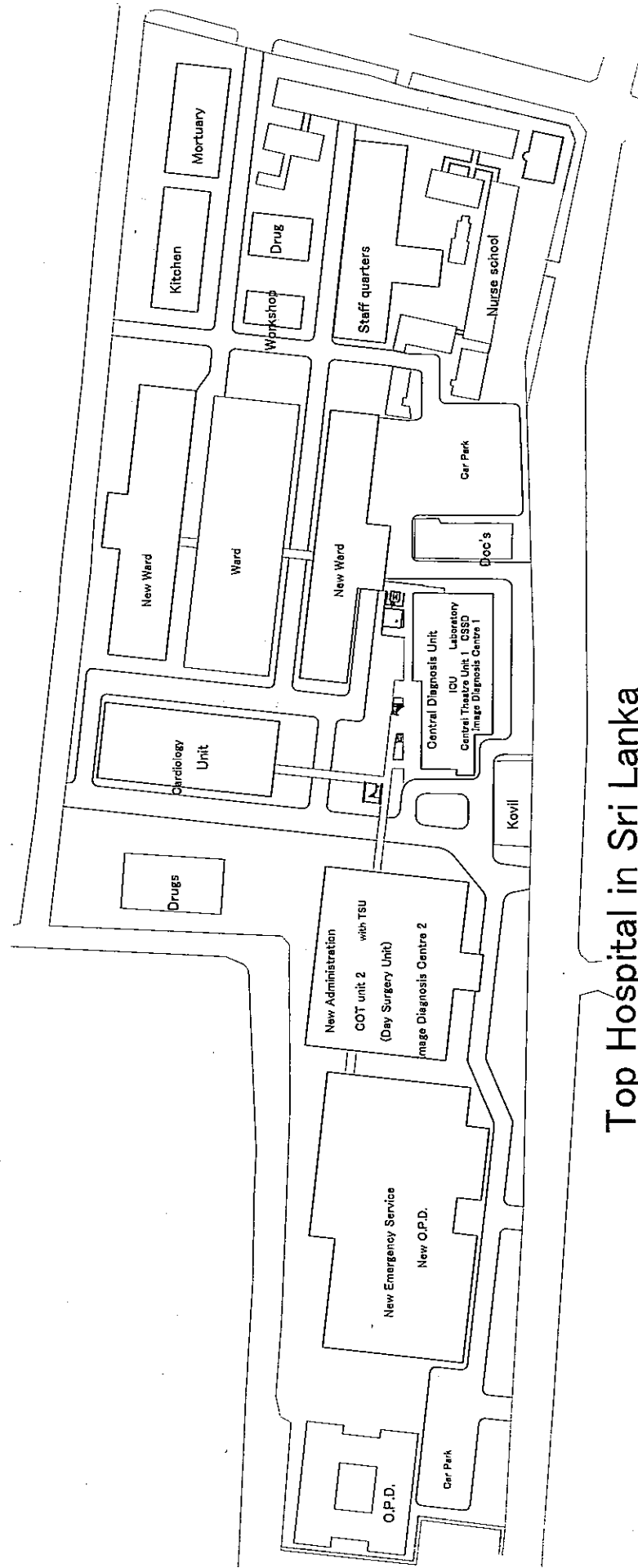
West Elevation



SECTION 1



SECTION 2



Top Hospital in Sri Lanka

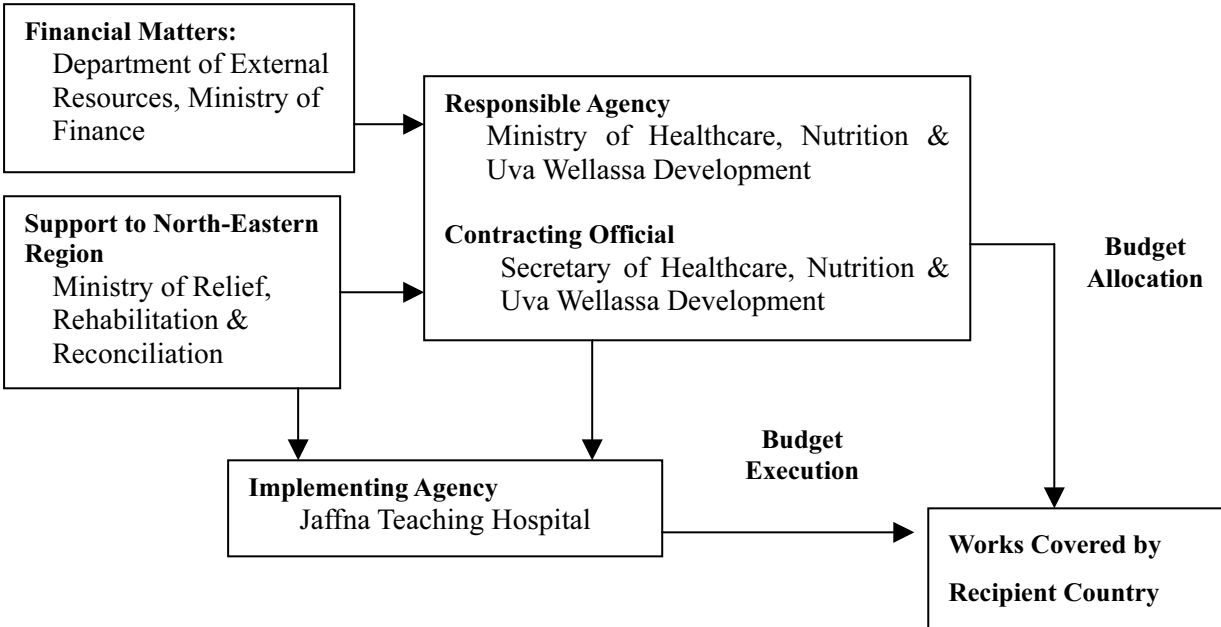
2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

This Project is to be implemented through grant aid from the Government of Japan following the decision by the Cabinet of the Government of Japan and the signing of Exchange of Notes by both governments. The following section outlines the basic matters concerning construction of the facilities and procurement and installation of equipment in this Project.

2-2-4-1-1 Organizations in Recipient Country

The following organizations in the recipient country are involved in the Project implementation:



2-2-4-1-2 Contract Package

It will be appropriate to contract construction and equipment works separately, given that both of these categories of work are of sufficient amount and not closely related with each other.

2-2-4-1-3 Consultant

Immediately after the signing of the Exchange of Notes by both governments, the Ministry of Healthcare, Nutrition & Uva Wellassa Development (MOH) will conclude a consulting service agreement with a consultant in Japan and obtain verification of the Government of Japan. The consultant will prepare detailed design documents based on the contents of Basic Design Study Report, assist in tendering, and execute construction and procurement/installation supervision.

2-2-4-1-4 Contractors

The contractor undertaking construction works and the contractor undertaking equipment works will be selected from Japanese firms as prescribed under the grant aid system. The construction contractor will be selected by prequalification and tendering, and the equipment contractor will be selected by tendering. Based on the result of tendering, MOH will conclude a construction work contract and an equipment work contract with the lowest bidders as a general rule, then obtain verification of the Government of Japan. Depending on the contents of works, the Japanese contractors may use subcontractors in Sri Lanka mainly for the purposes of labor, procurement of local materials, customs clearance, etc.

There are contractors for the construction of residential buildings in Jaffna City. None, however, can perform construction of large-scale public facilities, as no major developments were undertaken in the area during the civil war. Thus, most local contractors will need to be found in Colombo. Private hospitals are constructed actively in Colombo for these years, and local constructors have sufficient experience with this type of project. Tasks requiring more sophisticated techniques, however, have usually been handled by engineers from other countries, such as Singapore. In this Project, engineers will need to be sent from Japan or a third country to handle medical gas works, fixture works requiring high air-tightness, epoxy flooring requiring flat finishing, works related to power supplies for medical equipment, air-conditioning works requiring a high level of cleanliness.

2-2-4-2 Implementation Conditions

2-2-4-2-1 Procurement of Materials

The contractors will need to procure basic construction materials from Colombo and other areas in Sri Lanka. Imported materials will be unloaded at Colombo Port, cleared through customs, and transported northward along Highway A9. This highway is the only route for both domestic and imported materials to pass through the northern region, and the four checkpoints along the way are expected to prolong the journey. From a logistical perspective, the development of meticulous procurement plans and sufficient inventories of construction materials near the construction site will be crucial to prevent delays in the construction materials. For this purpose, a site for the storage of materials must be secured in Jaffna City.

2-2-4-2-2 Construction Works on the Hospital Premises

As the selected construction site is adjacent to the road, construction vehicles will be able to directly enter the site without passing through the premises of the Hospital. The construction vehicles

will have to share the road with patients and medical workers in automobiles and ambulances traveling to and from the hospital, as only one road has access. Thus, traffic safety personnel and other safety measures will be required for the control of the use of the road by the construction vehicles.

A Hindu temple is located next to the construction site within the premises of the Hospital. Contractors and others will have to be considerate of temple visitors on a daily basis. Care must also be taken to remember the dates of festivals and religious events, and accommodate them however possible.

The existing Operation Theater Building is also located next to the construction site. Therefore, special attention must be paid to vibration and dust generated by construction works.

2-2-4-2-3 Security Measures

Although a cease-fire agreement was concluded on February 27, 2002, a peace agreement has not been signed as of August 2005. It is necessary to work on the basis of safety first, taking measures such as constant information collection concerning the security in the local area and interruption of work as needed at the time of disorder.

2-2-4-3 Scope of Works

The construction, procurement, and installation works will be implemented through the cooperation between the Governments of Japan and Sri Lanka in the framework of grant aid. The following summarizes the contents of works and tasks to be covered by each country.

(1) Works Covered by Grant Aid from the Government of Japan

1. Works Related to Facilities

- Construction of the building described in the Basic Design Study Report (including electrical, air-conditioning, sanitary and plumbing facilities)
- Water facilities needed in the building constructed in this Project (including water reservoir and elevated water tank)
- Drainage facilities to the point of connection to the sewer on the premises (including neutralization tank and sterilization tank)
- Provision of temporary office, workers' lodgings, materials yard, etc. outside the premises of the Hospital

2. Works Related to Equipment

- Procurement and installation of medical equipment described in the Basic Design Study

Report.

3. Infrastructure Works

- New electrical, water supply, and drainage facilities in the construction site

4. Exterior Works

- Pavement of passageways on the premises, exterior lamps, and border fences facing the road in the construction site

5. Related Procedures

- Transportation of materials and equipment from Japan and/or a third country to Sri Lanka, and procedures related to the transportation of materials and equipment
- Inland transportation within Sri Lanka

(2) Works Covered by the Government of Sri Lanka

1. Works Related to Premises and Exterior

- Relocation of hospital functions in the construction site; renovation of existing buildings as needed
- Rerouting of existing connecting corridors in the construction site
- Demolition of existing structures, existing border fences, trees, and other obstacles, and leveling of the ground
- Rerouting of existing electricity conduits, water pipes, and other utility lines in the construction site
- Exterior works, including planting and landscaping

2. Infrastructure Works

- Provision of an electric power line to the site and payment of levies
- Provision of a telephone line to the site and payment of levies
- Provision of water supply and drainage connections and payment of levies

3. Works Related to Preparation for Construction

- Provision of land for temporary office, workers' lodgings, materials yard, etc. outside the premises of the Hospital

4. Works Related to Equipment, Furniture, and Fittings

- Moving and installation of existing equipment to be relocated to the building constructed in this Project
- Procurement and installation of the equipment, furniture and fittings, etc. not covered by the Government of Japan

5. Procedures and Bearing of Costs

- Costs related to Banking Arrangement and Authorization to Pay.
- Costs related to tax exemption procedures
- Prompt execution of customs clearance
- Procedures required in relation to inland transportation
- Exemption of Japanese nationals engaged in the implementation of the Project (based on a verified contracts) from customs duties, internal taxes, and fiscal levies which may be imposed in Sri Lanka
- According the said Japanese nationals with such facilities as may be necessary for their entry into Sri Lanka and stay therein
- Maintenance costs for appropriate and effective operation of the facility and equipment
- Cost of various procedures related to construction, including but not limited to, building permission, inspection and building usage permission.
- All the expenses, other than those covered by the Japanese Grand Aid, necessary for the Project.

2-2-4-4 Consultant Supervision

In accordance with the grant aid system of the Government of Japan, the Japanese consultant firm will conclude a consultant agreement with the responsible organization of the Government of Sri Lanka and execute the detailed design and supervision of construction/equipment works. The purpose of the supervision is to confirm whether or not the works are implemented according to design documents; provide instruction, advice, and coordination during the work period from a fair position to ensure appropriate execution of the work contract; and to control the quality of work. The works of the consultant include the following:

1. Assistance in the Tendering and Construction Contract and Equipment Contract

The consultant will prepare tender documents and other materials needed for tendering to select the Japanese contractors undertaking construction works and equipment works; assist Sri Lankan side in carrying out tender including tender announcement, receiving of tender applications, prequalification, distribution of tender documents, acceptance of tenders, and evaluation of tenders; and provide advice on the conclusion of contracts between the responsible organization of Sri Lanka and the contractors.

2. Instruction, Advice, and Coordination to Contractors

The consultant will review work schedules, work plans, plans for procurement of construction materials and machinery, plans for equipment procurement and installation, etc., and provide

instruction, advice, and coordination to contractors.

3. Inspection and Approval of Working Drawings, Production Drawings, etc.

The consultant will conduct inspection and advice concerning the working drawings, production drawings, documents, etc. submitted by contractors, and provide approval.

4. Confirmation and Approval of Construction Materials and Machinery and Medical Equipment

The consultant will confirm that the construction materials and machinery and medical equipment to be procured by the contractors are in conformity with the contract documents, and approve the use of such items.

5. Plant Inspection

As needed, the consultant will attend the inspections of the production processes of construction parts and medical equipment to ensure product quality and performance.

6. Reporting of the Progress of Work

The consultant will keep track of the work processes and the situation of the project sites and report the progress of work to both countries.

7. Completion Inspection and Test Operation

The consultant will conduct completion inspection and test operation of facilities and equipment, confirm the conformity with the contract documents, and submit inspection reports to the Sri Lankan side.

In view of the scale of the Project, the consultant will send one engineer to Sri Lanka throughout the work period. Engineers will also be sent to the project site as appropriate, according to the progress of works to perform necessary inspection, instruction, and coordination. Engineers in charge of the Project will also be assigned in Japan in order to establish lines of communication between the project site and backup personnel in the head office. These engineers stationed in Japan will report on the progress of the Project, payment procedures, completion and transfer, and other issues to the relevant officials of the Government of Japan.

2-2-4-5 Quality Control Plan

Prior to the commencement of construction works, the consultant will direct the Japanese constructor to prepare work manual, including inspection parameters, target values, contents of inspection, test methods, curing methods, work methods, applicable standards, etc. as listed below, and perform quality control.

Table 2-6 Quality Control Plan

Work Type	Control Parameter	Target Value	Test Method	Quality Standards	Frequency of Measurement	Treatment of Results
Earth work	Bearing capacity of ground	Ra=250kN/m ² or more (long-term)	Plate bearing test	JGS1521-1995	2 locations or more	Test report
	Slope angle	Within planned range	Gauge, visual	JIS	As needed	Photos, documents
	Bedding accuracy	Within +0~-5cm	Level, visual		"	"
	Foundation work height	Within +0~-3cm	"		"	"
	Thickness of replaced soil	+5cm~0	"		"	"
Reinforcement bars	Reinforcement cover thickness	Places not in contact with soil: 30m/m Places in contact with soil: Footing 60m/m Other 40m/m	Visual, measurement	BS Specifications	As needed	Photos, documents
	Processing accuracy	Stirrup, hoop ±5m/m Other ±10m/m	"		"	"
	Tensile test	Standard strength or more	On-site sampling or sampling at shipping	BS	1 test on 3 test pieces per 300t of steel bars with given diameter	Test result report
Concrete work (on-site mixing)	Compressive strength	Designed strength 27N/mm ² or more	Attending at test site (any time)	BS	3 or more test pieces for each placing and per 50m ³	Test result report
	Slump value	15cm±2.5cm	Attending at work site		For each placing	Photos, documents
	Chloride content	0.3kg/m ³ or less	Test pieces, attending at work site		"	"
	Air content	45% ±1.5%	Attending at work site		For each placing	Photos, documents
	Concrete temperature	30 deg. or less	Attending at work site		For each placing	Photos, documents
Masonry	Compressive strength of concrete blocks	40~70kg/cm ²	Attending at test site after selection of manufacturer		Once before shipment from factory	Test result report
Plastering Painting Roof waterproofing Fixtures	Materials, storage methods, work methods, mixing, coating thickness, curing, work accuracy	According to separate specifications	Same as left	Same as left	As needed	Photos, documents
Water supply & drainage	Water supply pipes	"	Pressure test	BS	On completion of pipe laying, for each system	Test result report
	Drainage pipes	"	Water filling test			
Electrical work	Cables	"	Insulation test	BS	"	"
			Conductivity test			

2-2-4-6 Procurement Plan

(1) Policies Concerning Procurement of Materials and Equipment

The materials and equipment used in this Project will be procured in accordance with the following policy. Products complying with British Standards (BS), the prevailing standards used in the recipient country, will be procured. If BS standards regarding particular items are unavailable or inappropriate, JIS standards will be applied.

1. Local Procurement

To facilitate maintenance and repair after the completion of the facilities, materials and equipment will be procured locally whenever possible. Products which are normally imported to the recipient country and available in the market will be regarded as local products.

2. Procurement by Importation

If imported products cannot be procured locally in sufficient quantities, such products will be imported from Japan and/or a third country.

(2) Procurement Plans for Materials and Equipment

The plans for procurement of main materials and equipment used in construction works and in equipment works are as shown below.

Table 2-7 Plan for Procurement of Construction Materials and Equipment

Work Type	Item	Source			Remarks
		Local	Japan	third country	
Construction work	Cement	○			BS-compliant products normally available in the local market.
	Sand	○			Harvesting of river sand is regulated and the supply is unstable. Will be procured from Colombo.
	Gravel	○			The limestone gravel available from Jaffna is unusable. Will be procured from Colombo.
	Reinforcement bar	○			Local products are available.
	Form panels	○			Local products are available.
	Terrazzo tile	○			Local procurement is possible.
	Tile	○			Same as above.
	Epoxy poured flooring		○		Japanese are advantageous both in quality and price.
	Glass	○			Local procurement is possible.
	Timber	○			Local procurement is possible.
	Aluminum sash	○			Local procurement is possible.
	Doors for operation rooms and X-ray rooms		○		Japanese are advantageous both in quality and price.
	Wood fixture	○			Produced locally.
	Fitting for fixture	○			Imported products are available locally.
Paint	○			Locally available imported products.	
Plumbing/ Mechanical work	Pump	○			Local procurement is possible.
	Fan	○			Same as above.
	Sanitary wares	○			Same as above.
	Sanitary wares for handicapped		○		Japanese are advantageous both in quality and price.
	PVC pipe	○			Local procurement is possible.
	Galvanized steel pipe	○			Same as above.
	Fire hydrant		○		Japanese are advantageous both in quality and price.
	Fire extinguisher	○			Local procurement is possible.
	Solar panel heater	○			Local procurement is possible.
	Electric water heater		○		Japanese are advantageous both in quality and price.
	Medical gas system		○		Japanese are advantageous both in quality and price.
	Air conditioners	○			Local procurement is possible.
	Air cleaners	○			Same as above.
	Ducts	○			Same as above.
Copper pipings		○		Japanese are advantageous both in quality and price.	

Work Type	Item	Source			Remarks
		Local	Japan	third country	
Electrical work	Main Distribution Board, switchboard			○	Imported from a third country.
	Emergency generator			○	Same as above.
	Lighting fixture	○			Local procurement is possible.
	Alarm bell facility	○			Local procurement is possible.
	Conduit (PVC pipe)	○			Local procurement is possible.
	Power supply facility for medical equipment		○		Products will be imported from a third country when advantageous in quality and price.

(3) Equipment Procurement Plan

1) Procurement Plan

The equipment to be procured will be the products of Japan or Sri Lanka as a rule. However, if procurement from a third country is considered desirable due to price advantages, maintenance advantages, or other factors such as popularity in Sri Lanka, procurement from a third country will also be considered based on the following conditions and the approval of both countries. Procurement plans for other items will place priority on reliable delivery times and price advantages.

- The manufacturer has a branch office or sales agency in Sri Lanka, providing advantage in maintenance.
- Failure and other troubles are rare and maintenance cost is low.
- A product of Japan or Sri Lanka does not exist or does not meet specifications.
- Servicing is easy and the manufacturer has a well-established maintenance system.
- The product is used widely in Sri Lanka.
- The product can be procured and delivered before the time limit of the E/N.

The possibility of procurement from a third country is considered for the following items in this project.

Table 2-8 Equipment Procurable from a Third Country

Category	Items	Country of Origin
Operation room	Anesthetic apparatus	US, EU
	Anesthetic apparatus with ventilator	US, EU
	Autoclave, large size	US, EU
	Autoclave, medium size	US, EU
	Defibrillator	US, EU
	Electrosurgical unit, complete	US, EU
	Electrosurgical unit, simple	US, EU
	Operation Lamp	US, EU
	Operation Lamp, mobile with battery backup unit	US, EU
	Operation monitor	US, EU
	Operation table	US, EU
	Operation table, orthopedic	US, EU
	Stretcher for recovery room	US, EU
	Surgical hand scrub unit	US, EU
	Syringe pump	US, EU
Automatic disinfectant	US, EU	
ICU	Central monitor	US, EU
	Defibrillator	US, EU
	ECG	US, EU
	ICU bed	US, EU
	Infusion pump	US, EU
	Patient monitor	US, EU
	Stretcher, radio-transparent	US, EU
	Syringe pump	US, EU
	Ventilator for adult	US, EU
	Ventilator for pediatrics	US, EU
Laboratory	Automatic biochemistry analyzer	US, EU
	Blood gas analyzer	US, EU
	ELISA reader	US, EU
	ELISA washer	US, EU
	Flame photometer	US, EU
	Microscope	US, EU
	Microscope with CCD camera and monitor	US, EU
	PH meter	US, EU
	Semi automated coagulation analyzer	US, EU
	Spectrophotometer	US, EU
Diagnostic Imaging Room	Mammography unit	US, EU
	Mobile X-ray unit	US, EU
	Ultrasound scanner, B/W	US, EU
	Ultrasound scanner, color Doppler	US, EU
	X-ray system, fluoroscopy	US, EU
	X-ray system, simple bucky stand	US, EU
Physiology Room	EEG	US, EU
	ECG	US, EU
	ECG, Holter testing	US, EU
	ECG, stress testing	US, EU
Training management	Multimedia projector	US, EU
Maintenance	Computer, desktop type	US, EU

2) Transportation Plan

Transportation Method

Equipment procured from Japan and/or a third country will be transported by sea.

Transportation Route

- Equipment procured from Japan and/or third country

These items will be shipped by sea from a port in Japan and/or in a third country to Colombo Port, then by land transport from Colombo Port to the construction site.

- Equipment procured in Sri Lanka

These items will be shipped by land transport to the construction site.

2-2-4-7 Implementation Schedule

When the Governments of Japan and Sri Lanka sign the Exchange of Notes concerning the implementation of this Project, the construction of the facility and the procurement / installation of equipment will be conducted in the stages outlined below.

1. Detailed Design

After conclusion of the consulting service agreement, the consultant will prepare detailed design drawings, specifications, and tender instructions based on the Basic Design Study Report. Meanwhile, approval concerning various design documents will be obtained through consultation with persons concerned on the Sri Lanka side. This stage is expected to require 6.0 months to complete.

2. Tender

Construction works and equipment works will be ordered separately, and the contractor undertaking each category of work will be determined by tendering. The works related to tendering will take about 4.0 months.

3. Construction Works and Equipment Works

The work term of this stage is expected to be about 21.0 months.

In view of the contents and scale of the Project, local situations concerning construction and equipment procurement, and other factors, the Project is expected to be implemented over a period of four fiscal years. Detailed design will be commenced in the first year, and tendering, construction works, equipment procurement and installation will be conducted from the second year onward.

Considering the above factors, the implementation schedule of the Project from the E/N to completion of work will be as shown below. This schedule does not include any period of interruption of works due to security reasons. In such cases, completion date of the Project will be delayed accordingly.

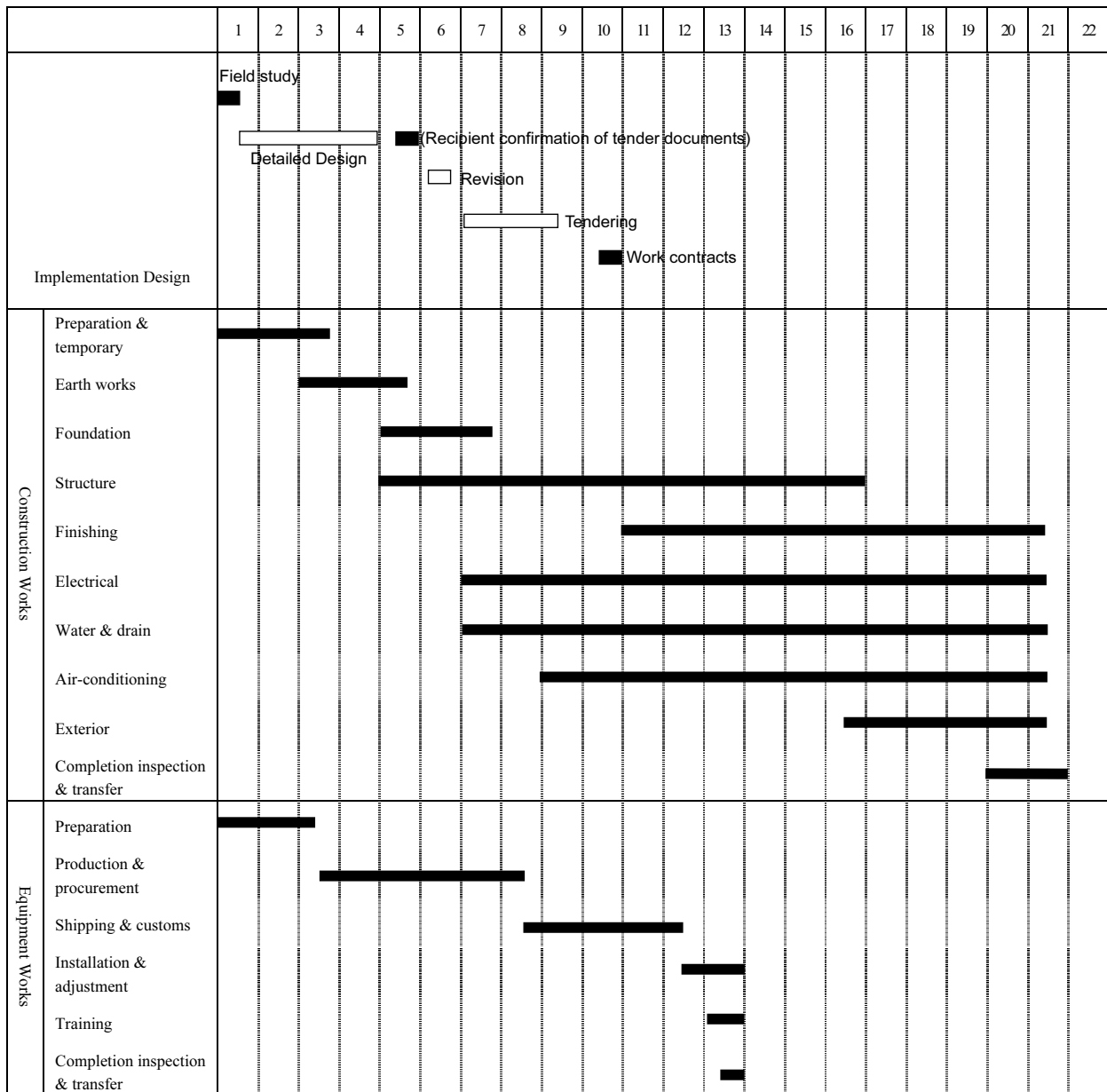


Fig. 2-10 Implementation Schedule

2-3 Obligations of Recipient Country

This Project corresponds to the early stage of a Master Plan to redevelop the existing hospital on the same premises. Already prior to this Project, the Jaffna Teaching Hospital has commenced the construction of a kitchen and mortuary buildings.

The following lists the existing buildings to be demolished for the construction site for this Project.

Table 2-9 Buildings at the Construction Site

Building	Structure	Floor Area (m ²)	Remarks
Garage	RC, metal roof	180	
Bicycle Garage	RC, metal roof	140	
Surgery Ward (Ward 16 for women)	One-story, brick	440	Over 100 years old
Surgery Ward (Ward 23 for women)	One-story, brick	460	Over 100 years old
Dermatology Department	One-story, brick	450	
Wards 17 and 18 (Ob-Gyn, Orthopedics, ENT, Dentistry)	Two-story, brick	1000	Over 100 years old
Lavatory	One-story, brick	50	
cecb Field Office	One-story, brick	50	
Dining Hall	One-story, brick	210	
	Total	2980	

These buildings now contain 162 beds, about 16% of all beds in the Hospital. Based on the improvement plan in the Master Plan, these wards will be improved by phased construction of new wards, supported by the use of district-level medical facilities for the time being. The Master Plan envisions an eventual consolidation of all wards in the Hospital into 3 buildings.

Redevelopment such as the relocation of medical services from the buildings at the construction site of this Project should be conducted in conjunction with other steps included in the Master Plan. Accordingly, it will not be appropriate to include the cost for these works under the scope of obligation of Sri Lanka side for this Project. The estimated project cost will therefore include only direct costs such as the cost for the demolition of the buildings at the construction site. Relocation of medical services and related works must be covered by super-ordinate plans.

In the Minutes of the Discussions on Basic Design Study, the Sri Lankan side agreed to assume the responsibility for performing all activities required to meet the important requirements stated in the text and the general requirements of Japanese grant aid when this Project is implemented.

Important Issues Stated in the Minutes of Discussions

1. The Sri Lankan side promised to take necessary measures with the Ministry of Finance to exempt

the Japanese nationals engaged in the Project from customs duties, internal taxes, and fiscal levies which may be imposed in Sri Lanka, with respect to the supply of products and services under the verified contracts.

The Sri Lankan side also agreed to make every effort to convince the LTTE (Liberation Tigers of Tamil Elam) not to charge the Japanese nationals engaging in the Project any commissions, charges, levies, etc. with respect to the supply of products and services, including construction materials, construction machinery, construction expatriates, local personnel, construction labor, building equipment, furniture, and medical equipment under the verified contracts.

2. The Sri Lankan side promised to clear the land through demolition of the existing buildings at the construction site and relocation of the infrastructure no later than six months after the signing of the Exchange of Notes by both governments.
3. The Sri Lankan side promised to allocate necessary budget and manpower for the proper maintenance and utilization of the equipment and facilities to be provided under the Project.
4. The Sri Lankan side promised to relocate the equipment under usage at the existing buildings to the new facility if and when needed.

General Requirements of Japanese Grant Aid

1. To secure the land necessary for the Project;
2. To clear and level the site for the Project prior to the commencement of the construction;
3. To provide a proper access road to the Project site;
4. To provide facilities for distribution of electricity, water supply, a telephone trunk line, drainage, and other incidental facilities outside the site;
5. To undertake incidental outdoor works, such as gardening, fencing, exterior lighting, and other incidental facilities in and around the Project site, if necessary;
6. To ensure prompt unloading, tax exemption, and customs clearance of the products purchased under the Japanese Grant Aid at ports of disembarkation in the Recipient Country;
7. To exempt Japanese nationals from customs duties, internal taxes, and fiscal levies which may be imposed in the Recipient Country with respect to the supply of the products and services under the verified contracts;

8. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into the Recipient Country and stay therein for the performance of their work;
9. To bear commissions, namely advising commissions of an Authorization to Pay (A/P) and payment commissions, due to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A);
10. To provide necessary permissions, licenses, and other authorization for implementing the Project, if necessary;
11. To ensure that the facilities constructed and equipment purchased under the Japanese Grant Aid are maintained and used properly and efficiently for the Project; and
12. To bear all expenses, other than those covered by the Japanese Grant Aid, necessary for the Project.

Estimation of Project cost

1. Project cost estimation conditions:

- a. Estimation date: August 2005
- b. Exchange rate: 1US\$= 108.48JPY, 1LKR = 1.0924JPY

2. Estimated Project Cost to be Borne by Government of Japan

Estimated total: approx. 1,927million yen

Construction of central function building (total floor area: approx. 6,870m²)

item	Estimated cost (million JPY)	
Facility	1,376	1,735
Equipment	359	
Detail design and supervision		192

This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant.

3. Estimated Project Cost to be Borne by the Government of Sri Lanka

• Premises Preparation Works		
- Demolition of existing buildings and leveling of ground	Rs	1,200,000
• Preparation for Construction		
- Rerouting of existing connection corridors	Rs	14,000,000
- Rerouting and Temporary provision of electricity	Rs	164,000
- Rerouting and Temporary provision of telephone	Rs	92,000
- Rerouting and Temporary provision of city water	Rs	2,000,000
• Infrastructure Works		
- Construction of outdoor sub-station	Rs	1,880,000
- Provision of telephone trunk line		(Existing)
- Provision of city water	Rs	100,000
• Exterior Works		
- Planting	Rs	1,400,000
• Furniture and Fixtures (excluding medical equipment)	Rs	8,000,000
• Relocation of Existing Equipment		
CT scanner	Rs	1,000,000
Sub Total	Rs	<u>29,836,000</u>
VAT (15%)	Rs.	4,475,400
Total	Rs.	<u>34,311,400</u>
• Exemption of taxes (custom duties and VAT) of contracts funded by Japanese Government		
Including commission charges of banks	Rs	446,278,000
Grand Total	Rs	<u>480,589,400</u>

Other than above costs, following work have to be implemented by Government of Sri Lanka.

1. Relocation of existing health care function within the construction site. This may require construction of new facilities.
2. Moving of existing function to the new completed building. Cost for moving existing medical equipment and furniture.
3. Cost for procuring/renting land for temporary stockyard and lodging area for construction workers during construction period.

2-4 Project Operation Plan

2-4-1 Operation Plan

Because this Project is the renewal and improvement of an existing facility, current medical staff will take charge of the operation of the Central Functions under the Project.

2-4-2 Maintenance Plan

2-4-2-1 Present Situation of Facility Maintenance

The management department of the Hospital employs one official responsible for heading facility maintenance, under whom 9 maintenance technicians (6 pump technicians, 1 plumber, 1 carpenter, and 1 mason) perform routine maintenance. Two of these technicians work night shifts.

Facilities that cannot be managed by the facility Maintenance Department are entrusted to external contractors. An engineering firm called cecb (a semi-governmental organization) now stations personnel at the Hospital to handle this work. cecb was initially entrusted this job from 1985 to 1995, then the Building Department of the Ministry of Construction moved in from 1996 to 2002. cecb has been back at the hospital since in 2003 (when organizational changes enabled it to resume its maintenance works.)

The repair, renovation, demolition, and construction of buildings conducted by cecb are commissioned on a piecework basis, as opposed to yearly contract. The commission fee is 10% of the amount of work contracted. The total amount of work has increased year by year, rising from about 20 million rupees in 2003 to an estimated 50 million rupees in 2005. The Hospital itself can pay up to 2 million rupees. Payments in larger amounts must be approved in advance by MOH.

Maintenance of air conditioners is outsourced to Auto Cooling Service, generators to Brown & Company, and sewage treatment to cecb. The outsourcing of sewage treatment will be outsourced to another private company in the next fiscal year.

2-4-2-2 Present Status of Medical Equipment Maintenance

The maintenance of medical equipment is handled by two departments and outsourced personnel.

2-4-2-2-1 Department for Repair of Simple Medical Instruments and Furniture

This is a workshop attached to the Orthopedics Department. Three experienced workers from the Maintenance Department work here to manufacture and repair crutches, wheelchairs, beds, etc.

2-4-2-2-2 Medical Equipment

Maintenance of medical equipment is conducted by the Jaffna Hospital Branch of Biomedical Engineering Service (BES) under MOH. BES maintains all electronic medical equipment through the labors of 1 engineer and 3 technicians. Their main tasks are to replace fuses, replace light-bulbs, and troubleshoot. Lack of workspace, precise measuring instruments, and adequate tools generally prevents them from handling anything but minor works. Items that cannot be managed by the BES branch in the Hospital are either shipped to the BES headquarters in Colombo or repaired by engineers sent from headquarters.

The most common task is to repair protective parts for power supply circuitry which have burned out due to large fluctuations in the mains power. While these personnel are experienced in this type of repair, their performance is undermined by shortages of tools and difficulties in obtaining spare parts. Repair works are also hindered by the decrepit condition of aging equipment and the loss of manuals and other maintenance documents. Although BES personnel have completed basic training, repair often takes long time due to the lack of sufficient reference materials, tools, and measuring instruments. The BES personnel work from 8 a.m. to 4 p.m. from Monday to Saturday, plus overtime work when requested by the Hospital.

2-4-2-2-3 Outsourcing

Equipment that cannot be repaired in the hospital or the BES headquarters in Colombo (radiation equipment, laboratory equipment, etc.) is entrusted to the agencies of the manufacturers.

2-4-2-3 Maintenance Plan

2-4-2-3-1 Facility Maintenance Plan

The facility to be constructed under this Project does not include interior or exterior finishes requiring special maintenance. This Project is an early stage of the Master Plan developed by the Hospital, and construction of wards and other activities will continue after the Project is complete. Accordingly, the engineering firms and other organizations now stationed at the Hospital will presumably stay on after the completion of the Project and implement the next phase of the Master Plan. Thus, the maintenance of the facilities provided in this Project can be performed properly under the guidance of this engineering firm.

Air conditioning facilities and emergency generator facilities are the only components of this Project to require the outsourcing of maintenance, as with existing equipment. While

high-performance filters (HEPA filters) are planned for the air conditioning of operation rooms, these filters are also incorporated in existing air conditioning facilities. Therefore, the technical level of the current outsourcing contractors is assumed to be sufficient for the maintenance of the new systems. The various types of pumps to be used for the sanitation facilities can be properly maintained by the current staff. To ensure proper maintenance of the neutralization tank and sterilization tank, the current maintenance personnel will need to be instructed on the feeding of chemical solutions and other maintenance methods before the completion of this Project.

2-4-2-3-2 Medical Equipment Maintenance Plan

The current medical staff will have no difficulty in using the equipment to be procured under this Project, given that this equipment will be equivalent to the equipment currently in use. To facilitate maintenance, various manuals will be delivered together with the equipment and the methods of use will be explained at the time of installation. In addition, work efficiency is expected to increase by the supply of tools and measurement instruments needed for maintenance.

Thus, the current personnel of the BES Jaffna Teaching Hospital Branch will be able to perform routine repair and inspection works to a certain extent. However, many of the planned devices contain electronic parts which will be difficult for the current personnel of the BES branch to maintain. For this reason, radiation equipment, laboratory equipment, physiology test equipment, etc. will require a maintenance system based on maintenance contracts with the agencies of the manufacturers. The Annex lists the items expected to require yearly maintenance contracts.

2-4-3 Operation and Maintenance Costs

2-4-3-1 Estimated Budget

The following Table shows the result of estimation concerning the operation and maintenance costs after the implementation of this Project.

Item	Cost (SR)	Remarks
Personnel	171,722,518	Same as in 2004
Drugs	8,492,896	Same as in 2004, as the number of beds is unchanged
Medical supplies	3,502,966	Twice the amount in 2004
Test reagents	0	Included in equipment maintenance
Medical gas	5,285,384	Twice the amount in 2004
General consumables	2,897,937	Same as in 2004
Meals	7,362,205	Same as in 2004, as the number of beds is unchanged
Transportation	2,468,983	Same as in 2004
Utilities	37,990,805	See details
Security & cleaning	8,994,217	See details
Equipment maintenance	32,987,648	See details
Total	281,705,559	

2-4-3-2 Basis for Cost Calculation

Operation and maintenance costs are estimated based on the assumptions described below. The subsidies from MOH and similar revenues of the Hospital are assumed to be unchanged from the levels of 2004. Price escalations are not considered.

2-4-3-2-1 Operation Cost

1) Personnel Cost

This Project aims to enable more effective provision of medical services through consolidation and improvement of the central diagnosis and care functions now dispersed in the existing facility. Jaffna Teaching Hospital has contemplated the hiring of more personnel, particularly nurses, in the future to compensate for shortages in its cadre. However, it is not possible to estimate how many will be actually assigned. Thus, an increase in personnel costs has not been considered.

2) Medical Care Activities

An increase in medical activities mainly results in increases in hospitalization costs, costs related to surgery, testing costs, etc. However, the number of beds in the Hospital will remain unchanged, as this is not to be covered under the Project. Thus, the higher costs generated by the increase in medical care activities after this Project is executed will be primarily limited to testing costs and medical supply costs related to surgery. There are 8 operation rooms at present. Five of them will continue to be used for emergency and minor operations (2 emergency rooms and 3 ophthalmology rooms) and 8 will be newly constructed, bringing the total up to 13. The ICU will expand from the current 10 beds to 22 beds. As a result, the cost related to medical care activities

is assumed to be double that incurred in 2004. The cost related to tests is estimated separately.

2-4-3-2-2 Utility Cost

The estimated utility costs in the newly constructed facility are presented below.

1) Electricity Charge Rs 6,722,880/year

Assumption on contract demand: Contract demand is assumed to be about 60% of the transformer capacity of the power receiving/transforming facility.

Transformer capacity 630 kVA x 0.6 = 378 kVA

Table 2-10 Calculation of Power Demand

Power Supplied To	Expected Installed Capacity	Expected Demand Rate	Max. Power Demand	Remark
Medical Equipment	210 kVA	15 %	31.5 kVA	X-ray units, 210 kVA
	360 kVA	40 %	144 kVA	
Air-conditioning/ Ventilation Facilities	280 kVA	80 %	224 kVA	
Water Supply, Drainage & Sanitation Facilities	60 kVA	20 %	12 kVA	
Lighting Facilities	110 kVA	80 %	88 kVA	
Receptacles	30 kVA	20 %	6 kVA	
Other Loads	10 kVA	20 %	2 kVA	
Firefighting Facilities	30 kVA	0 %	0 kVA	
Total	1,100 kVA		507.5 kVA	

- Assumption on power consumption: From “Max. Power Demand” in the Table of Calculation of Power Demand,

Weekday 500 kW x 0.3 (mean demand rate) x 10 hours x 20 days = 30,000 kWh/month

Holiday 500kW x 0.1 (mean demand rate) x 10 hours x 10 days = 5,000 kWh/month

- Annual electricity charge

Base rate (fixed): Rs 800/month x12 months = Rs 9,600..... i)

Max. demand charge:

378 kVA x Rs 480/kVA·month x 12 months = Rs 2,177,280/year ii)

Electricity charge:

35,000 kWh/month x Rs 10.8/kWh x 12 months = Rs 4,536,000/year..... iii)

i) +ii) +iii) = Rs 6,722,880/year

2) Telephone Charge Rs 164,250/year

- Number of subscriber lines: 2 lines, newly installed

- Assumption on call charge:

Assumed number of outside calls per subscriber line: 10 calls/line day

Length of call: 5 min/call

- Annual telephone charge

2 lines x 10 calls/line x 5 min x 365 days = 36,500 min/year

A half of the above time is assumed to be local calls and the other half is assumed to be long-distance (mostly domestic) calls.

Local calls: 36,500 min/year x 0.50 x Rs 2.5 = Rs 45,625 i)

Long-distance calls: 36,500 min/year x 0.45 x Rs 5.0 = Rs 82,125 ii)

International calls: 36,500 min/year x 0.05 x Rs20.0 = Rs 36,500 iii)

i) +ii) +iii) = Rs 164,250/year

3) City Water Charge Rs 234,000/year

City Water Consumption in New Facility

The expected water supply in this facility is as follows:

Persons in the facility:

Workers About 150 persons (120 L/day·person)

Outpatients (including attendants) About 1,500 persons (15 L/day·person)

150 persons x 120 L/day·person + 1,500 persons x 15 L/day·person \doteq 40,000 L/day

As the ratio between potable and non-potable water is 50 : 50, the city water supply is calculated as follows:

Potable water $40 \text{ m}^3/\text{day} \times 0.5 \doteq 20 \text{ m}^3/\text{day}$

As 20% of this quantity derives from rainwater, the consumption of city water will be approximately:

$20 \text{ m}^3/\text{day} \times 0.8 = 16 \text{ m}^3/\text{day} = 5,840 \text{ m}^3/\text{year}$

At this level of consumption, the charge for city water will be approximately:

$5,840 \text{ m}^3/\text{year} \times 40 \text{ Rs}/\text{m}^3 \doteq 234,000 \text{ Rs}/\text{year}$

4) Fuel Cost for Emergency Generator Rs 861,120/year

- Emergency generator: 250kVA, fuel consumption 60L/h

Power outages are assumed to last about 3 hours per week.

Annual fuel cost:

$60 \text{ L}/\text{h} \times 3 \text{ hours} \times 2 \text{ generators} \times 52 \text{ weeks} \times \text{Rs}46/\text{L} = \text{Rs } 861,120/\text{year}$

From the above results, the utility cost in the new building will be:

Electricity charge	6,722,880	Rs/year
Telephone charge	164,250	Rs/year
City water charge	234,000	Rs/year
Fuel cost for emergency generator	861,120	Rs/year
Total	7,982,250	Rs/year
Utility cost of Jaffna Teaching Hospital (2004)	30,008,555	Rs/year
Grand total after completion of new facility	37,990,805	Rs/year

5) Security and Cleaning Cost

Cost for maintenance of paint and other finishes in the facility constructed under this Project:

$$200 \text{ Rs/m}^2/\text{year} \times 6,750 \text{ m}^2 = 1,350,000 \text{ Rs/year}$$

While the cost of facility maintenance is not reported as an accounting item, repair of finishes is assumed to be included in the cleaning cost. Therefore, the above amount is added to the current amount of security and cleaning cost.

Maintenance cost of the new facility	1,350,000	Rs/year
Security and cleaning cost (2004)	7,644,217	Rs/year
Total	8,994,217	Rs/year

6) Building facility and Medical Equipment Maintenance Cost

1. Air conditioning system maintenance cost

The maintenance cost for Air conditioning system after the implementation of this Project will include maintenance contract cost with mechanical agencies and the cost for periodical exchange of HEPA filters. See the Appendix 12 for details.

Maintenance contract fee	2,906,667	Rs/year
<u>HEPA filter maintenance</u>	<u>356,190</u>	<u>Rs/year</u>
Total	3,262,857	Rs/year

2. Medical Equipment Maintenance Cost

The maintenance cost for medical equipment after the implementation of this Project will include the cost for the purchase of consumable supplies and spare parts for equipment and the maintenance contract fees paid to the agencies of the manufacturers of medical equipment. See the Appendix 10 for details.

Consumable and spare parts	23,968,905 Rs/year
<u>Maintenance contract fee</u>	<u>5,755,885 Rs/year</u>
Total	29,724,791 Rs/year

Total: 32,987,648 Rs/year

2-4-3-3 Expected Budgetary Balance after Implementation of the Project

As an institution under the direct control of MOH, the Jaffna Teaching Hospital is operated by subsidies from the Ministry. The following table compares the estimated balance after Project implementation compares with the balances in 2003 and 2004.

Table 2-11 Budgetary Balance of Jaffna Teaching Hospital

		2003	2004	After the Project	Remarks	
Incomes	Operation cost from Ministry	205,300,000	303,540,000	303,540,000		
	Investment cost from Ministry	59,285,105	67,500,000	67,500,000		
	Medical certificate fee	243,541	221,589	221,589		
	Employment promotion subsidy	772,697	537,365	537,365		
	Rent income	20,885	51,096	51,096		
	Carry over		39,446,622	39,446,622		
	Total	265,622,228	411,296,672	411,296,672	A	
Expenses	Personnel cost	148,343,106	171,722,518	171,722,518		
	Drugs	2,409,634	8,492,896	8,492,896		
	Medical supplies	822,379	1,751,483	3,502,966		
	Test reagents	1,343,898	1,112,919	0		
	Medical gas	1,399,506	2,642,692	5,285,384		
	General expendables	2,891,379	2,897,937	2,897,937		
	Meals	4,392,353	7,362,205	7,362,205		
	Transportation	1,604,828	2,468,983	2,468,983		
	Utilities	12,869,711	30,008,555	37,990,805		
	Security & cleaning	4,768,915	7,644,217	8,994,217		
	Equipment maintenance			32,971,648		
	Sub-total	180,845,709	236,104,405	281,689,559	B	
				Difference	45,585,154	
	Other (including investment)	45,364,163	139,626,901	129,607,113	= A - B	
Grand total	226,209,872	375,731,306	411,296,672			

The actual and planned balance of MOH is as shown in Table 4-3. The budget for fiscal 2007 is projected to increase to 1.8 times that of 2004, and further increase is expected by 2008, the year scheduled for project completion. With the increase in the budget of the Ministry, the budget allocated to each hospital is also expected to increase. The budget allocated from the Ministry to Jaffna Teaching Hospital is also expected to increase.

In 2004, Jaffna Teaching Hospital had a carry-over budget of about 40 million rupees for the year.

The projected expenses after the implementation of the Project will be an increase of approximately 41,190,000 rupees from the figure in 2004, and this increase is largely comparable to the carry-over budget. The item “Other” in expenses includes the budget for investment in facility improvement based on the Master Plan. If we disregard the amount carried forward to the next year, we can secure roughly the same budget for investment as in 2004 after the completion of the facility. In addition, the budget for continued implementation of the Master Plan after the completion of this Project will be sufficiently covered by the increase in the budget from the Ministry.

Table 2-12 Actual and Projected Balance of the Ministry of Health

Department/Project	Actual 2003 Rs:'000	Projected 2004	Projected 2005	Planned 2006	Planned 2007
Ordinary expenses	13,359,156	15,139,485	19,027,921	20,538,880	22,600,842
Regional development			6,000	6,287	6,538
General health care	2,903,672	3,213,857	8,817,212	9,607,962	10,864,670
Hospitals	9,236,619	10,213,432	9,353,166	10,031,893	10,793,892
Public health	1,127,079	1,611,606	771,573	809,278	848,944
Research and development	91,786	100,590	79,970	83,460	86,798
Capital investment	4,339,585	6,178,400	10,856,817	13,930,090	17,397,879
Regional development		9,700	266,000	259,600	337,380
General health care	446,048	283,330	277,650	637,380	826,700
Hospitals	3,879,261	5,135,100	7,947,500	9,611,200	12,296,880
Public health	14,276	658,170	2,360,867	3,415,670	3,928,807
Research and development		4,800	4,800	6,240	8,112
Total amount	17,698,741	21,317,885	29,884,738	34,468,970	39,998,721

Source: Ministry of Health, Nutrition and Uva Wellassa Development of Sri Lanka

Note: The budget for teaching hospitals is included in the “Hospitals” area.

Chapter 3 Project Evaluation and Recommendation

Chapter 3 Project Evaluation and Recommendations

3-1 Effects of the Project

(1) Expected direct effects

The following direct effects are expected to result from implementation of this project:

1) Restoration of functions as a tertiary care facility

The health care functions of the Jaffna Teaching Hospital as a tertiary care facility can be restored by improvement the facilities and equipment of the hospital that have been decrepit with no appropriate capital investment made in it for the past 20 years or more. There are no other tertiary care hospital existing in the northern region, patients requiring high-level health care service are transferred to Colombo City, 420 km away from the region, causing significant burden on the patients. Because the transportation costs are unaffordable, the poverty group cannot receive appropriate tertiary health care service. The improvement of facilities and equipment in this project will enable prompt and appropriate provision of the high-level health care services needed in this region and permit the qualitative improvement of the healthcare service in the whole region.

2) Promote efficient health care service in the hospital by centralization and integration of the central health care functions

The efficiency of hospital functions can be improved by centralizing the operation rooms and intensive care units that are distributed in individual departments at present, and integrate them in the same building with the diagnostic imaging rooms and the laboratory rooms that are currently located separately. More specifically, such effects as shortening of patients' waiting time, shortening of travel distance within the hospital, shortening of the time required for test results to become clear are expected. In addition, effective utilization of limited operation resources such as anesthesiologists and nurses skilled in surgery, sterilization of surgical instruments and so on through the centralization of operation departments is expected to result in improvement in efficient service.

3) Promoting the implementation of the Jaffna Teaching Hospital Master Plan

There is a great demand for the Jaffna Teaching Hospital as the only advanced medical institution in the northern region with the bed occupancy rate amounting to 120%. To cope with the situation, the hospital formulated a Master Plan for overall improvement, and started the improvement from

2004. The improvement of the central health care functions is the key phase of this Master Plan as it is integral to the overall efficient operation of the hospital but is most difficult to improve. Once this department has been improved, the improvement of mainly ward units which are relatively easy to implement can follow. Thus this project implemented by Japanese grant aid scheme will comparatively shorten the whole improvement period. The tertiary health care service urgently needed in the northern region can be provided sooner.

(2) Indirect effects

1) Improvement in medical education functions

The Hospital is the teaching hospital of Jaffna University Medical Faculty, the only one medical faculty in the northern region. Provision of human resources to medical institutions in the region is chiefly shouldered by this medical faculty. Human resources in many of the lower-level medical facilities are too insufficient to provide appropriate health care services (the number of physicians in Jaffna Province as of 2002 was 0.2 per one thousand population against the national average number of physicians per one thousand population being 0.5). It is expected that improvement in the central functions of Jaffna Teaching Hospital and restoration of the functions as a tertiary care facility by this project will result in improvement in quality of the medical education of the region and increase in the number of physicians in the region.

2) Promotion of reconstruction of the northern region

The northern region, which was exhausted by the protracted civil war, is pursuing improvement by making the most of donated funds in accordance with the Reconstruction Project formulated after the cease fire agreement. The region has so far started improvement of relatively smaller scale structures such as elementary schools and clinics. This project targets central functions of the tertiary care facility, in which full-fledged improvement will result in promotion of the reconstruction project for the whole northern region.

(3) Formulation of output indicators

The output indicators used in this project will be the number of operations, the number of examinations, the number of patients in the northern region of the country, and the number of physicians in Jaffna Province.

3-2 Recommendations

- (1) This project will centralize the Operation Theater Complex of Jaffna Teaching Hospital and therefore require acquisition of specialized management knowledge. To this end, appropriate education and training needs to be provided to anesthesiologists and nurses about the management of the Operation Theater Complex.
- (2) In order to restore the functions of the hospital as a tertiary care facility on a full-scale basis, it is desirable that Wards and the Outpatient Department be appropriately improved in accordance with the Master Plan. In addition, the functions as an educational hospital need to be continuously improved in accordance with the Master Plan as well.
- (3) It is desirable that future Reconstruction Projects continuously improves the lower-level medical facilities as well, allow the referral system in health care to be restored and result in alleviation of the concentration of patients on Jaffna Teaching Hospital.
- (4) Maintenance of medical equipment is conducted by engineers of the Biomedical Engineering Service (BES) under the Ministry of Healthcare, Nutrition and Uva Wellassa Development (MOH), who are stationed inside the Jaffna Teaching Hospital. However, it is desired to further strengthen the maintenance system to execute continuous and effective maintenance work through such measures as concluding maintenance contracts with the agencies for the manufacturers of sophisticated equipment and building services.
- (5) It is desirable that an annual report concerning the management status of the hospital (such as the disease structure of outpatients, the disease structure of inpatients, the number of operations and its breakdown, the number of laboratory testing and its breakdown, the bed occupancy rates by department, the average lengths of the hospital stay by department, the number of patients referred to Jaffna Teaching Hospital, the number of patients referred to higher-level medical facilities in other cities, and the financial status) along with the implementation of this project. This will enable the continuous monitoring of the management status of the hospital and allow formulation and implementation of appropriate improvement plans in the future.

[APPENDICES]

1. Member List of Study Team
2. Study Schedule
3. List of Parties Concerned
4. Minutes of Discussions
5. Soil Investigation Report
6. Water Quality Test Report
7. Examination List of Requested Equipment
8. Planned Equipment List
9. Detail of main equipment
10. Annual contract prices for equipment maintenance
11. Annual maintenance cost
12. Annual Maintenance cost for Air conditioners

1. Member List of Study Team

1. Member List of Study Team

(1) Basic Design Study (February 13, 2005~March 14, 2005)

No.	Name	Job Title	Organization
1.	Mr. Hideaki HARADA	Team Leader	Group Director Project Management Group III Grant Aid Management Department Japan International Cooperation Agency
2.	Dr. Yujiro HANDA	Technical Adviser	Senior Advisor, Dr.med.dent. Dr.med.sc. Institute for International Cooperation Japan International Cooperation Agency
3.	Mr. Kenya YOSHINO	Project Coordinator	Health Team Project Management Group III Grant Aid Management Department Japan International Cooperation Agency
4.	Mr. Mineo NAGAOKA	Project Manager	Yamashita Sekkei Inc.
5.	Mr. Masaru FUJINUMA	Architect	Yamashita Sekkei Inc.
6.	Mr. Fumitaka KAMON	Engineer	Yamashita Sekkei Inc.
7.	Mr. Masatsugu SUZUKI	Engineer	Yamashita Sekkei Inc.
8.	Mr. Yasuhiro HIRUMA	Equipment Planner	International Total Engineering Corporation
9.	Mr. Hideki MIYAMAE	Equipment Planner	International Total Engineering Corporation
10.	Mr. Kenji ISHIDA	Equipment Planner	International Total Engineering Corporation

Draft Report Explanation (July 17, 2005~July 26, 2005)

No.	Name	Job Title	Organization
1	Mr. Shumon YOSHIARA	Team Director	Group Director Project Management Group III Grant Aid Management Department Japan International Cooperation Agency
2	Mr. Mineo NAGAOKA	Project Manager	Yamashita Sekkei Inc.
3	Mr. Masaru FUJINUMA	Architect	Yamashita Sekkei Inc.
4	Mr. Hideki MIYAMAE	Equipment Planner	International Total Engineering Corporation
5	Mr. Shigehito AKAGI	Equipment Planner	International Total Engineering Corporation

2. Study Schedule

2. Study Schedule

(1) Basic Design Study (February 13, 2005~March 14, 2005)

No.	dates		Place	JICA Harada Yoshino Yoshino Kenya	JICA Handa Yujiro	Consultants						
						A	B	C	D	E	F	G
						Project manager NAGAOKA MINEO	Architect FUJINUMA MASARU	Equipment Engineer 2 HIRUMA YASUHIRO	Electrical Engineer KAMON FUMITAKA	Construction specialist SUZUKI MASATSUGU	Equipment Engineer 1 MIYAMAE HIDEKI	Equipment Enginner 3 ISHIDA KENJI
1	13-Feb	Sun			Tokyo-Singapore-Colombo (+0:15)							
2	14-Feb	Mon	Colombo		Discussion with Ministry of Health, inception reports and questionnaires Discussion with Ministry of Relief, Rehabilitation and				Market survey Site survey quotations			
3	15-Feb	Tue	Colombo Jaffna		To Jaffna07:45-08:55 Inception reports	Discussion with Jaffna Hospital Questionnaires		Colombo:Market survey		To Jaffna07:45-08:55		
4	16-Feb	Wed	Jaffna		Discussion with Jaffna Hospital			To Jaffna07:45-08:55		Site survey		
5	17-Feb	Thu			Jaffna health system surve							
6	18-Feb	Fri			Discussion with Jaffna Hospital							
7	19-Feb	Sat		Tokyo- Singapore- Colombo (+0:15)	Discussion with Jaffna Hospital							
8	20-Feb	Sun	Colombo	Colomb o-Jaffna	Disussion among the team						Colombo~9:45-11:25	
9	21-Feb	Mon	Jaffna		Discussion with Jaffna Hospital, draft minutes							Colombo - Tokyo
10	22-Feb	Tue			Discussion with Jaffna Hospital, draft minutes							
11	23-Feb	Wed	Jaffna		To Colomb o9:45- 11:25	Ministry of Health minutes		Site surveys, existing condition surveys				
12	24-Feb	Thu			Signing of Minutes at Ministry of Health		Site surveys, existing condition surveys		To Colombo09:45-11:25			
13	25-Feb	Fri		Colombo - Tokyo								
14	26-Feb	Sat	Colombo		Market survey							collection of answers
15	27-Feb	Sun	Jaffna		Survey of equipment agencies			Survey of construction materials				
16	28-Feb	Mon			To Jaffna 07:45-08:55							
17	1-Mar	Tue			Discussion with Jaffna Hospital							
18	2-Mar	Wed	Jaffna		Discussion with Jaffna Hospital							
19	3-Mar	Thu	Colombo		To Colombo 09:45-11:25					Colombo ~ 09:45- 11:25		
20	4-Mar	Fri	Colombo		Visit to Ratnapura General Hospital			Colombo - Tokyo		Visit to Ratnapura General Hospital		
21	5-Mar	Sat			Disussion among the team							
22	6-Mar	Sun			Disussion among the team							
23	7-Mar	Mon			Visit to The National Hospital							
24	8-Mar	Tue			Discussion with local consultants in Colombo							
25	9-Mar	Wed			Market surveys in Colombo							
26	10-Mar	Thu										
27	11-Mar	Fri			Discussion with Ministry of Health							
28	12-Mar	Sat			Report to JICA							
29	13-Mar	Sun			Discussion among the team							
30	14-Mar	Mon			Colombo - Tokyo							

(2) Basic Design Draft Explanation (July 17, 2005~July 26, 2005)

No.	date	day	Leader	Chief Consultant/ Architecture Planner	Architecture Designer	Equipment Planner	Equipment Planner	Place
			YOSHIARA, Shumon	NAGAOKA, Mineo	FUJINUMA Masaru	MIYAMAE, Hideaki	AKAGI, Shigehito	
1	7/17	Sun	Narita 11:30 (SQ997) → 17:25 Singapore, 22:40 (SQ402) →					Colombo
2	7/18	Mon	0:20 Colombo, AM: Courtesy call on JICA office, EoJ, PM: MoH, RRR, MoF					Colombo
3	7/19	Tue	am 07:30 Colombo (EXV711) → 09:00 Jaffna (Palaly) Discussion with JTH reg. Draft basic design					Jaffna
4	7/20	Wed	Discussion with JTH reg. Draft basic design Discussion on the draft of Minutes of Discussions with JTH					Jaffna
5	7/21	Thu	am 09:30 Jaffna (Palaly) (EXV712) → 10:45 Colombo					Colombo
6	7/22	Fri	Signing of the Minutes of Discussion with MoH, RRR, MoF, JTH PM: Report to EoJ and JICA office,					Colombo
7	7/23	Sat	Team Leader only 01:35 Colombo (SQ401) → 07:25 Singapore, 17:45 Narita Other consultants; additional surveys					Colombo
8	7/24	Sun						Colombo
9	7/25	Mon						Local agent surveys
10	7/26	Tue	01:35 Colombo (SQ401) → 07:25 Singapore, 17:45 Narita					—

3. List of Parties Concerned

3. List of Parties Concerned

1. Ministry of Healthcare Nutrition Uva Wellassa Development

Hon Ministry Nimal Siripala de Silva	Honorable Minister
Mr. Ranjith Maligaspe	Secretary
Dr. Athula Kahandaliyanage	Director General of Health Services
Dr. H.S.B. Tennakoon	Deputy Director of Planning
Dr. V. Jeganathan	Consultant

2. Ministry of Finance, Department of External Resources

Mr. J.H.J. Jayamaha	Additional Director General
Ms. R.V. Nanayakkara	Additional Director General
Mr. Mapa Pathirana	Director

3. Ministry of Relief, Rehabilitation & Reconciliation

Mr. M. S. Jayasinghe	Secretary
Mr. S. Sivananthan	Senior Advisor

4. Jaffna Teaching Hospital

Dr. Subramaniam Raviraj	Acting director
Mr. Ratnam Pathmanathan	Mr. Nallathamby Canagarathnam
Dr. Rasiah Ganeshamoorthy	Dr. Theivendran Senkamalam
Dr. Selvaratnam Jeyaratnam	Dr. Singaravelu Kumaravel
Dr. Kanapathypillai Umapathy	Dr. Selvaratnam Gowri
Dr. Sivapalan Sivansuthan	Dr. Thambipillai Peranantharajah
Dr. Sinnapillai Nagendran	Dr. Jeyadevi Ganeshamoorthy
Dr. Nadarajah Jeyakumaran	Dr. Sivarajasigam Navaneethan
Dr. Saravanamuththu Kugathasan	Dr. Vanniasegaram Shivantha
Dr. Sinnathamby Sivasubramaniam	Dr. Shanmugaratnam Sumathy
Dr. Selvarajah Mugunthan	Dr. Thurairajah Pushparajah
Ms. Leelawalthy Rajaneyagam	Mr. Siyasankar Sivananthan
Mr. Xavier Ranjan	Mr. Kathiramalai Murugananthan

5. CEB : Ceylon Electricity Board, Jaffna

Mr. Shanmnganathan	Acting DGM, Chief Engineer, Construction
Mr. N.Kugathsan	Electrical Superintendent

6. Fire Service, Municipal Council, Jaffna

Mr. K.S.Anantharajah	Officer in charge, O.C.C. Fire Service, Jaffna
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7. Water Works Department, Municipal Council, Jaffna

Mr. V.Navaratnarajah	Engineer, Municipal Council, Jaffna
Mr. S.Kantha Rajeswara Saima	Water Works Engineer, Municipal Council, Jaffna

8. SLT : Sri Lanka Telecom

Mr. N.Saravanapavan	Regional Telecom Office Manager, SLT, Jaffna
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9. Environmental Office, Municipal Council, Jaffna

Mr. Suviyavajah	Officer in charge
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10. Environmental Engineering Consultants

Mr. K. Suntharalingam	Chief Consulting Engineer
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11. CECB
Mr. R. P. L. Muniratne
Mr. P. Ganeshalingam
Central Engineering Consultancy Bureau,
Deputy General Manager
Central Engineering Consultancy Bureau,
Civil Engineer
12. SIHRN
Mr. M.S. Ireneuss (Selvin)
Dr. Vigneswaran
Director
LTTE Director of Health Services
12. Government Agent, Jaffna
Mr. K. Ganesh
Government Agent, Jaffna
13. Embassy of Japan at Colombo, Sri Lanka
Mr. SUDA, Akio
Mr. KARUBE, Hiroshi
Mr. OHNISHI, Hideyuki
Mr. MIYAHARA, Yuji
Mr. IWASHITA, Koji
Ambassador Extraordinary and Plenipotentiary
Counsellor
First Secretary
First Secretary
First Secretary
14. JICA Colombo office
Mr. UESHIMA, Takumi
Mr. TAKIGUCHI, Toru
Mr. KOBAYASHI, Hideya
Mr. NISHIMARU, Shu
Resident Representative
Senior Adviser
Assistant Resident Representative
Programme Coordinator

4. Minutes of Discussions

**MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR
THE IMPROVEMENT OF CENTRAL FUNCTIONS OF JAFFNA TEACHING HOSPITAL
IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA**

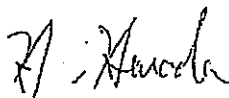
Based on the results of the Preparatory Study, the Government of Japan decided to conduct a Basic Design Study on the Project for the Improvement of Central Functions of Jaffna Teaching Hospital (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "Sri Lanka") the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Hideaki Harada, Group Director, Project Management Group III, Grant Aid Management Department, JICA, and is scheduled to stay in the country from 14th February 2005 to 14th March 2005.

The Team held discussions with the officials concerned of the Government of Sri Lanka and conducted a field survey at the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

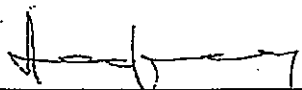
Colombo, 24th February 2005



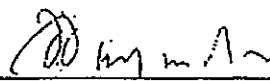
Mr. Hideaki Harada
Leader
Basic Design Study Team
Japan International Cooperation Agency



Mr. Ranjith Maligaspe
Secretary
Ministry of Healthcare, Nutrition &
Uva Wellassa Development



Mr. M.S. Jayasinghe
Secretary
Ministry of Relief, Rehabilitation and Reconciliation



Mr. J.H.J. Jayamaha
Additional Director General
Department of External Resources
Ministry of Finance



Dr. S. Raviraj
Acting Director
Jaffna Teaching Hospital

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the Central Functions of Jaffna Teaching Hospital through construction of facilities, procurement/installation of equipment and necessary activities.

2. Project site

The site of the Project is the premises of Jaffna Teaching Hospital, Jaffna District..

3. Responsible and Implementing Agency

3-1. The Responsible Agency is Ministry of Healthcare, Nutrition & Uva Wellassa Development (MOH). For the smooth implementation of the Project, MOH makes necessary arrangements to obtain advice and assistance from the Ministry of Relief, Rehabilitation and Reconciliation.

3-2. The Implementing Agency is Jaffna Teaching Hospital.

4. Items requested by the Government of Sri Lanka

After discussions with the Team, the items described in Annex-1 and Annex-2 were finally requested by the Sri Lankan side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

(1) Construction of the Buildings and Facilities

1-1. Operation Theater Complex including Central Supply & Sterilizing Department (CSSD)

1-2. Intensive Care Units (ICUs)

1-3. Central Laboratory Complex

1-4. Central Facilities for Diagnostic Imaging

Details of items are listed in Annex-1.

(2) Procurement and Installation of the Equipment for the above Buildings and Facilities.

Details of items are listed in Annex-2.

5. Japan's Grant Aid Scheme

5-1. Sri Lankan side understands the Japan's Grant Aid Scheme explained by the Team, as described in Annex-3.

5-2. Sri Lankan side will take the necessary measures, as described in Annex-4, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented. 7

6. Schedule of the Study

6-1. The consultants will proceed to further studies in Sri Lanka until 14th March 2005.

6-2. JICA will prepare the draft report in English and dispatch a mission in order to explain its contents around May 2005.

6-3. In case that the contents of the report is accepted in principle by the Government of Sri Lanka, JICA will complete the final report and send it to the Government of Sri Lanka by August 2005.

7. Other relevant issues

7-1. Both sides confirmed the items 7-1. to 7-5. of the Minutes of Discussions signed by both parties on 8th September 2004 remain valid.

7-2. Sri Lankan side promised to take necessary measures with the Ministry of Finance to exempt Japanese nationals who will be engaged in the Project, from customs duties, internal taxes and fiscal levies which may be imposed in Sri Lanka with respect to the supply of products and services under the verified contracts.

Also Sri Lankan side shall take every effort to convince LTTE (Liberation Tigers of Tamil Elam) not to charge against Japanese nationals who will be engaged in the Project any commissions, charges, levies and the likes imposed by LTTE with respect to the supply of products and services including construction materials, construction machineries, construction expatriate and local personnel, construction labors, building equipment, furniture, and medical equipment under the verified contracts.

7-3. Both sides confirmed the construction site of the new facility will be the land as described in Annex-5.

7-4. Sri Lankan side promised to clear the land through demolition of the existing buildings at the construction site and relocation of the infrastructure no later than six months after the signing of the Exchange of Notes by both governments.

7-5. Sri Lankan side promised to allocate necessary budget and manpower for the proper maintenance and utilization of the equipments and facilities to be provided under the Project.

7-6. Sri Lankan side promised to relocate the equipments under usage at the existing buildings to the new facility upon necessity.

7-7. The Team expressed the necessity of KAIZEN (Continuous Quality Improvement) activities by introduction of 5-S activities and standardized management information system at all divisions of Jaffna Teaching Hospital. Sri Lankan side understood the necessity of the mentioned managerial tools and agreed to take necessary actions for further improvement of quality of services.

Annex 1

Building content

Operation theater	Laboratories
Operation rooms	Microbiology, Biochemistry, Hematology,
Recovery room	Histo-Pathology, Clinical Pathology rooms
Other related rooms	Other related rooms
CSSD	Image Diagnosis
Washing room	x-rays
Sterilization	Dental x-ray
Clean store	Mammography
Other related rooms	Ultrasound
ICU	EEG rooms
ICU bed rooms	EKG rooms
Infectious ICU rooms	Endoscope rooms
Nurse station	Rooms for existing apparatus
Other related rooms	Other related rooms
	Generator

2

Lists of the Equipment

Annex-2

After discussion with the Team, these equipment in Annex-2 were finally requested by the Sri Lankan side. The final components of these equipment, however, will be examined according to the three graded priorities A, B and C in Lists of the Equipment, and will be modified by the Team after further survey and analysis in Japan.

The three graded priorities in Lists of the Equipment shall mean as follows.

- A : Appropriate to be procured, but its quantity is examined through further analysis.
 B : Its appropriateness and quantity to be procured is examined through further analysis.
 C : Not appropriate to be procured.

Department	Item No.	Description	Priority
Operation Theater Complex	OT-01	Anesthetic apparatus	A
	OT-02	Anesthetic apparatus with ventilator	A
	OT-03	Autoclave, large size	A
	OT-04	Autoclave, medium size	A
	OT-05	Blood warmer	B
	OT-06	C-arm X-ray unit	B
	OT-07	Defibrillator	A
	OT-08	Drug cabinet	B
	OT-09	Electric warming pad	B
	OT-10	Electrosurgical unit, complete	A
	OT-11	Electrosurgical unit, simple	B
	OT-12	Foot stool	B
	OT-13	Instrument set for amputation	B
	OT-14	Instrument set for cervical fusion surgery	B
	OT-15	Instrument set for cleft palate surgery	B
	OT-16	Instrument set for cut down	B
	OT-17	Instrument set for dilation & curettage	B
	OT-18	Instrument set for E.N.T. surgery	B
	OT-19	Instrument set for eye surgery	B
	OT-20	Instrument set for forearm surgery	B
	OT-21	Instrument set for gastrectomy	B
	OT-22	Instrument set for general surgery	B
	OT-23	Instrument set for intubation	B
	OT-24	Instrument set for laminectomy	B
	OT-25	Instrument set for meniscectomy	B
	OT-26	Instrument set for micro finger surgery	B
	OT-27	Instrument set for micro hand surgery	B
	OT-28	Instrument set for micro vascular surgery	B
	OT-29	Instrument set for minor and intermediate surgery	B
	OT-30	Instrument set for nephrectomy	B
	OT-31	Instrument set for neurology	B
	OT-32	Instrument set for oesophageal dilator	B
	OT-33	Instrument set for orthopaedic surgery	B
	OT-34	Instrument set for pediatric plastic surgery	B
	OT-35	Instrument set for prostatectomy	B
	OT-36	Instrument set for skin grafting	B
	OT-37	Instrument set for thoracic surgery	B
	OT-38	Instrument set for thyroidotomy	B
	OT-39	Instrument set for tonsillectomy	B
	OT-40	Instrument set for tracheostomy	B
	OT-41	Instrument set for vaginal hysterectomy & repair	B
	OT-42	Instrument table with guard rail	B
	OT-43	Instrument table with three fan-shaped tray	B
	OT-44	Instrument table, mayo's type	B
	OT-45	Kick bucket	B
	OT-46	Laundry cart	B
	OT-47	Neonatal resuscitator with over head warmer	B
	OT-48	Neuro muscular monitor	B
	OT-49	Operation chair	A
	OT-50	Operation Lamp	A
	OT-51	Operation Lamp, mobile with battery back up unit	B
	OT-52	Operation monitor	A
	OT-53	Operation table	A
	OT-54	Operation table, Orthopedic	A
	OT-55	Patient monitor	A
	OT-56	Recovery bed	A

Lists of the Equipment

Annex-2

Department	Item No.	Description	Priority
Operation Theater Complex	OT-57	Retractor set	B
	OT-58	Shelf for container	B
	OT-59	Shelf for instrument	B
	OT-60	Sink unit	B
	OT-61	Sterilizing container	B
	OT-62	Stretcher	B
	OT-63	Suction unit	A
	OT-64	Surgical hand scrub unit	A
	OT-65	Syringe pump	A
	OT-66	Ventilator	B
	OT-67	Warming blanket	B
	OT-68	Working table	B
	OT-69	X-ray film viewer	A
Intensive Care Units (ICUs)	IC-01	Ambubag for adult	A
	IC-02	Ambubag for pediatrics	A
	IC-03	Autoclave, table top type	A
	IC-04	Bedpan shelf	B
	IC-05	Blood gas analyzer	C
	IC-06	Blood warmer	B
	IC-07	Central monitor	A
	IC-08	Defibrillator	A
	IC-09	ECG	B
	IC-10	External cardiac pace maker	B
	IC-11	Glucosemeter	C
	IC-12	Hemoglobinmeter	C
	IC-13	ICU bed	A
	IC-14	Infusion pump	A
	IC-15	Laryngoscope	A
	IC-16	Mobile X-ray unit	C
	IC-17	Ophthalmoscope	B
	IC-18	Patient monitor	A
	IC-19	Patient monitor for pediatrics	A
	IC-20	Shelf for instrument	B
	IC-21	Shelf for linen	B
	IC-22	Spot lamp	B
	IC-23	Stethoscope	B
	IC-24	Stretcher	B
	IC-25	Stretcher, radiotransparent	A
	IC-26	Suotion unit	A
	IC-27	Syringe pump	A
	IC-28	Trolley	B
	IC-29	Ventilator	A
	IC-30	Ventilator for pediatrics	A
	IC-31	Wright spirometer	B
	IC-32	X-ray film viewer	A
Central Laboratory Complex	LA-01	Arm rest for blood collection	B
	LA-02	Autoclave, table top type	A
	LA-03	Autoclave, vertical type	A
	LA-04	Automatic biochemistry analyzer	B
	LA-05	Automatic blood cell analyzer	B
	LA-06	Balance	B
	LA-07	Bilirubinmeter	A
	LA-08	Blood culture monitor	C
	LA-09	Blood gas analyzer	A
	LA-10	Bottom, pyrex	C
	LA-11	Bunsen burner	B
	LA-12	Centrifuge	A
	LA-13	Drying cabinet	A
	LA-14	Electrolyte analyzer	B
	LA-15	Electrophoresis system	A
	LA-16	ELISA reader	B
	LA-17	ELISA washer	B
	LA-18	ESR analyzer	C
	LA-19	Flamephotometer	A
	LA-20	Freeze drier	A
	LA-21	Deep freezer	A
	LA-22	Glass ware set	B

Lists of the Equipment

Annex-2

Department	Item No.	Description	Priority	
Central Laboratory Complex	LA-23	Glucosemeter	A	
	LA-24	Haematoroglobin variant analyzer	C	
	LA-25	Heat dry block	A	
	LA-26	Hemoglobinmeter	A	
	LA-27	Hot air oven	A	
	LA-28	Hot plate	B	
	LA-29	Hot plate stirrer	A	
	LA-30	Incubator	A	
	LA-31	Laminar flow cabinet	A	
	LA-32	Liquid dispenser	B	
	LA-33	Media sterilizer	A	
	LA-34	Micro plate viewer	B	
	LA-35	Microscope	A	
	LA-36	Microscope with CCD camera and monitor	A	
	LA-37	Microtome	B	
	LA-38	Osmometer	B	
	LA-39	PH meter	A	
	LA-40	Pipette	C	
	LA-41	Pipette dryer	C	
	LA-42	Plate incubator	B	
	LA-43	Plate washer	B	
	LA-44	Refrigerator	A	
	LA-45	Rotamixer	A	
	LA-46	Semi automated coagulation analyzer	B	
	LA-47	Shelf for instrument	B	
	LA-48	Slide staining machine	B	
	LA-49	Spectrophotometer	A	
	LA-50	Standard wire loupe	C	
	LA-51	Stirrer	B	
	LA-52	Stopwatch	C	
	LA-53	Tissue processor	B	
	LA-54	Urine analyzer	A	
	LA-55	Urine meter	A	
	LA-56	UV Sterilizer	A	
	LA-57	Water bath	A	
	LA-58	Wire loupe, straight wire, normal	C	
	Central Facilities for Diagnostic Imaging (Radiology)	RA-01	Bone densitometer	C
		RA-02	Dark room accessories	A
		RA-03	Dental X-ray	A
		RA-04	Digital fluoro & radiography system	C
		RA-05	Digital mammography system	C
		RA-06	Examination table	B
		RA-07	High performance computer radiography system	C
		RA-08	Instrument table with guard rail	B
		RA-09	Laryngoscope set	B
		RA-10	Laser camera	C
		RA-11	Lead numbering set	A
		RA-12	Mammography unit	A
		RA-13	Mobile lamp	B
		RA-14	Mobile X-ray unit	A
		RA-15	C-arm X-ray unit	C
		RA-16	Pass box	A
		RA-17	Resuscitation bag for adult	B
		RA-18	Resuscitation bag for paediatrics	B
		RA-19	Shelf for instrument	B
		RA-20	Stretcher	B
		RA-21	Teleradiology	C
		RA-22	Ultrasound scanner, B/W	A
RA-23		Ultrasound scanner, color doppler	A	
RA-24		Ultrasound scanner, digital color doppler	C	
RA-25		Work station	C	
RA-26		X-ray film processor	A	
RA-27		X-ray film viewer	A	
RA-28		X-ray film viewer, Large	A	
RA-29		X-ray protective set	A	
RA-30		X-ray system, fluoroscopy	A	
RA-31		X-ray system, simple bucky and stand	A	

Lists of the Equipment

Annex-2

Department	Item No.	Description	Priority
Central Facilities for Diagnostic Imaging (Vital Sign Testing)	VS-01	Bronchoscope	B
	VS-02	Colonoscope	B
	VS-03	Cystoscope	B
	VS-04	Endoscopic retrograde cholangiopancreatography	B
	VS-05	Endoscopic cabinet	B
	VS-06	Examination table	B
	VS-07	Upper gastrointestinalscope	B
Central Facilities for Diagnostic Imaging (EEG)	EE-01	EEG	A
	EE-02	Examination table	B
Central Facilities for Diagnostic Imaging (ECG)	EC-01	ECG	A
	EC-02	ECG, holter testing . .	A
	EC-03	ECG, stress testing	B
	EC-04	Examination table	B
Common	CO-01	Digital voice recorder	B
	CO-02	Multimedia projector	B
	CO-03	Over head projector	B
	CO-04	TV & video recorder	B
	CO-05	White board	B
Maintenance for Equipment	ME-01	Computer, desk top type	B
	ME-02	Tool set	B

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ANNEX-3 : JAPANESE GRANT AID SCHEME

1. Grant Aid Procedure

1) Japanese Grant Aid Program is executed through the following procedures.

Application (Request made by a recipient country)

Study (Basic Design Study conducted by JICA)

Appraisal & Approval (Appraisal by the Government of Japan and Approval by Cabinet)

Determination of (The Notes exchanged between the Governments of Japan

Implementation and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request. If necessary, JICA send a Preliminary Study Team to the recipient country to confirm the contents of the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japanese Grant Aid Programme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

a) confirmation of the background, objectives and benefits of the Project and also institutional

- capacity of agencies concerned of the recipient country necessary for the Project's implementation;
- b) evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view;
 - c) confirmation of items agreed on by both parties concerning the basic concept of the Project;
 - d) preparation of a basic design of the Project; and
 - e) estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japanese Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even through they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participates the Study and prepares a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country, in order to maintain the technical consistency between the Basic Design and Detailed Design as well as to avoid any undue delay caused by the selection of a new consulting firm.

3. Japanese Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japanese Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

- 3) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

- 4) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

- 5) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability of Japanese taxpayers.

- 6) Undertakings required to the Government of the recipient country
- a) to secure a lot of land necessary for the construction of the Project and to clear the site;
 - b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
 - c) to ensure prompt unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;
 - d) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
 - e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be

necessary for their entry into the recipient country and stay therein for the performance of their work;

- f) to ensure that the facilities constructed and products purchased under the Grant Aid be maintained and used properly and effectively for the Project; and
- g) to bear all the expenses, other than those covered by the Grant Aid, necessary for the Project.

7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all the expenses other than those covered by the Grant Aid.

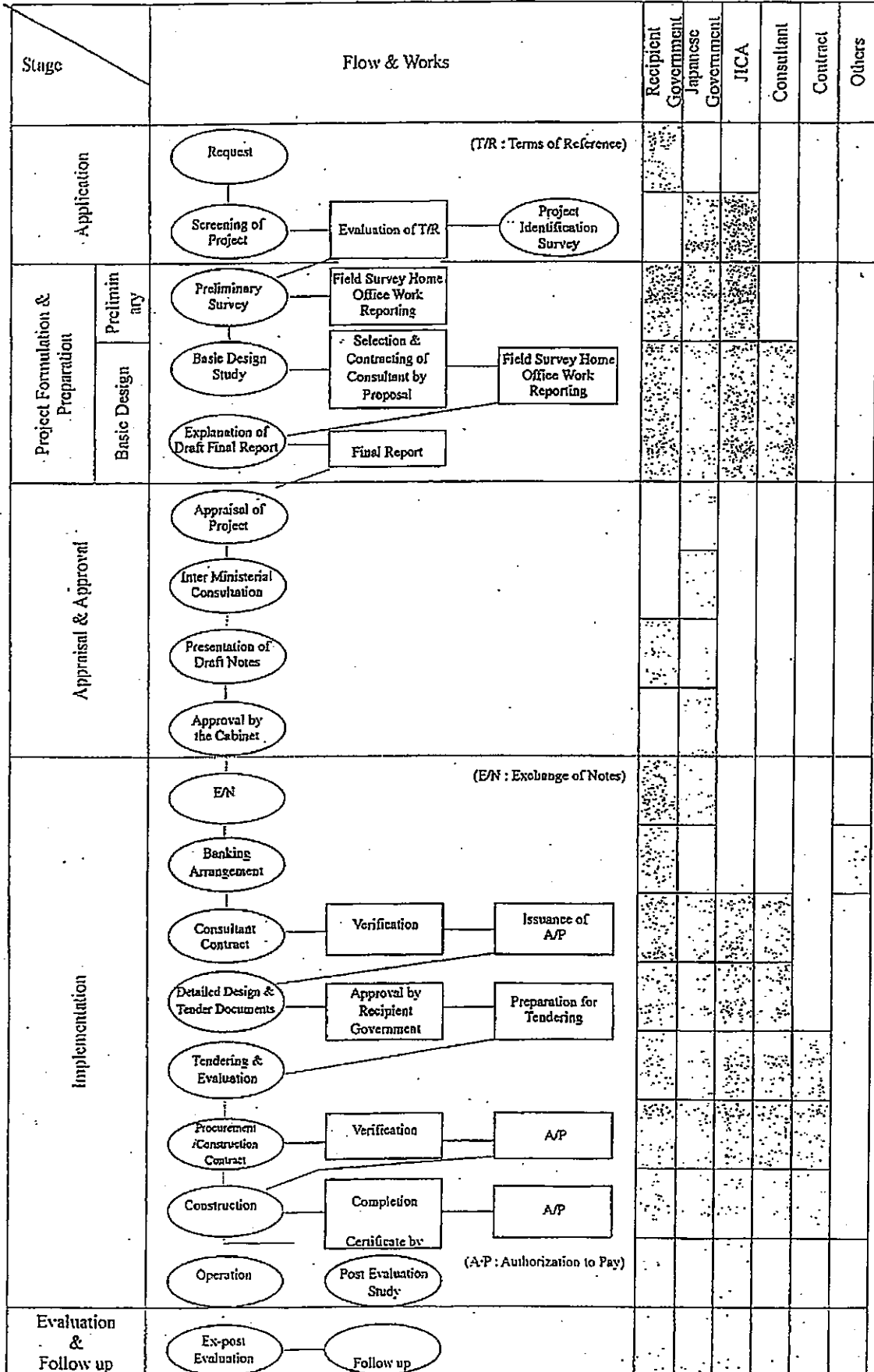
8) "Re-export"

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

9) Banking Arrangement (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

FLOW CHART OF JAPAN'S GRANT AID PROCEDURES



ANNEX-4: UNDERTAKINGS BY THE GOVERNMENT OF THE
RECIPIENT COUNTRY

1. To secure a lot of land necessary for the Project;
2. To clear and level the site for the Project prior to the commencement of the construction;
3. To provide a proper access road to the Project site;
4. To provide facilities for distribution of electricity, water supply, telephone trunk line and drainage and other incidental facilities outside the site;
5. To undertake incidental outdoor works, such as gardening, fencing, exterior lighting, and other incidental facilities in and around the Project site, if necessary;
6. To ensure prompt unloading and customs clearance of the products purchased under the Japanese Grant Aid at ports of disembarkation in the Recipient Country;
7. To exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in THE RECIPIENT COUNTRY with respect to the supply of the products and services under the verified contracts;
8. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into THE RECIPIENT COUNTRY and stay therein for the performance of their work;
9. To bear commissions, namely advising commissions of an Authorization to Pay (A/P) and payment commissions, to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A);
10. To provide necessary permissions, licenses, and other authorization for implementing the Project, if necessary;
11. To ensure that the facilities constructed and equipment purchased under the Japanese Grant Aid be maintained and used properly and effectively for the Project; and
12. To bear all the expenses, other than those covered by the Japanese Grant Aid, necessary for the Project.

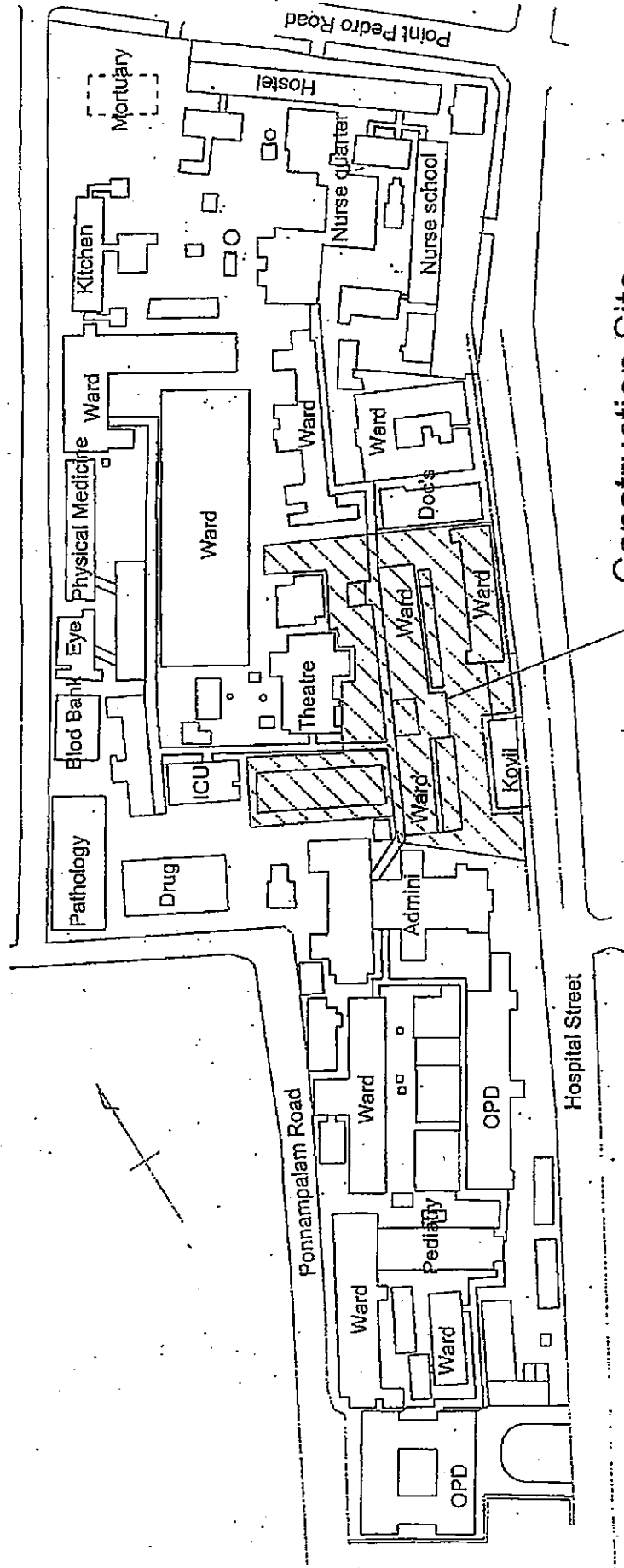
Major Undertakings to be taken by Each Government

NO	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
1)	Within the site	●	
2)	Outside the site		●
6	To construct the building	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
1)	Electricity		
a.	The distributing line to the site		●
b.	The drop wiring and internal wiring within the site	●	
c.	The main circuit breaker and transformer	●	
2)	Water Supply		
a.	The city water distribution main to the site		●
b.	The supply system within the site (receiving and/or elevated tanks)	●	
3)	Drainage		
a.	The city drainage main (for storm, sewer and others) to the site		●
b.	The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
4)	Gas Supply		
a.	The city gas main to the site		●
b.	The gas supply system within the site	●	
5)	Telephone System		
a.	The telephone trunk line to the main distribution frame / panel (MDF) of the building		●
b.	The MDF and the extension after the frame / panel	●	
6)	Furniture and Equipment		
a.	General furniture		●
b.	Project equipment	●	
8	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
1)	Advising commission of A/P		●
2)	Payment commission		●
9	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
1)	Marine(Air) transportation of the products from Japan to the recipient country	●	
2)	Tax exemption and customs clearance of the products at the port of disembarkation		●
3)	Internal transportation from the port of disembarkation to the project	●	

10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
13	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

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Annex 5



Construction Site
of THE PROJECT FOR THE IMPROVEMENT OF CENTRAL FUNCTIONS
of JAFFNA TEACHING HOSPITAL

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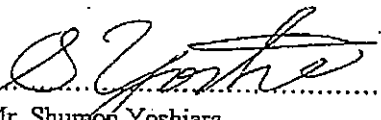
**MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR THE IMPROVEMENT OF CENTRAL FUNCTIONS
OF JAFFNA TEACHING HOSPITAL
IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
(EXPLANATION ON DRAFT REPORT)**

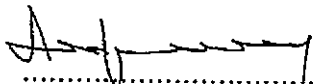
In February 2005, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for the Improvement of Central Functions of Jaffna Teaching Hospital (hereinafter referred to as "the Project") to the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "Sri Lanka"), and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

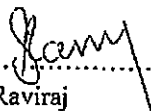
In order to explain and to consult with the Government of Sri Lanka on the components of the draft report, JICA sent to Sri Lanka the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Shumon Yoshiara, Team Director, Health Team, Project Management Group, Grant Aid Management Department, JICA, from 18th July 2005 to 26th July 2005.

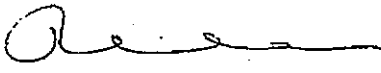
As a result of discussions, both parties confirmed the main items described on the attached sheets.

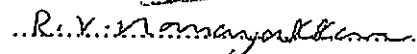
Colombo, 22nd July 2005


.....
Mr. Shumon Yoshiara
Leader
Draft Report Explanation Team
Japan International Cooperation Agency


.....
Mr. M.S. Jayasinghe
Secretary
Ministry of Relief, Rehabilitation and Reconciliation


.....
Dr. S. Raviraj
Acting Director
Jaffna Teaching Hospital


.....
Mr. Ranjith Maligaspe
Secretary
Ministry of Healthcare, Nutrition &
Uva Wellassa Development, National
Ministry of Uva Wellassa Development


.....
Mrs. R.V. Nanayakkara
Additional Director General
Department of External Resources
Ministry of Finance + Planning

ATTACHMENT

1. Components of the Draft Report

The Government of Sri Lanka agreed and accepted in principle the components of the draft report explained by the Team.

2. Japan's Grant Aid scheme

The Sri Lankan side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Sri Lanka as explained by the Team and described in Annex-3 and Annex-4 of the Minutes of Discussions signed by both parties on 24th February 2005.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed item and send it to the Government of Sri Lanka by December 2005.

4. Other relevant issues

4-1. Land Clearance

Sri Lankan side promised to reallocate the existing hospital services, clear the land through demolition of the existing buildings at the construction site and relocate the infrastructure no later than six months after the signing of the Exchange of Notes by both governments.

4-2. Proper Maintenance

Sri Lankan side promised to allocate necessary budget and manpower for the proper maintenance and utilization of the equipments and facilities to be provided under the Project.

4-3. Relocation of Equipments

Sri Lankan side promised to relocate the equipments under usage at the existing buildings to the new facility upon necessity.

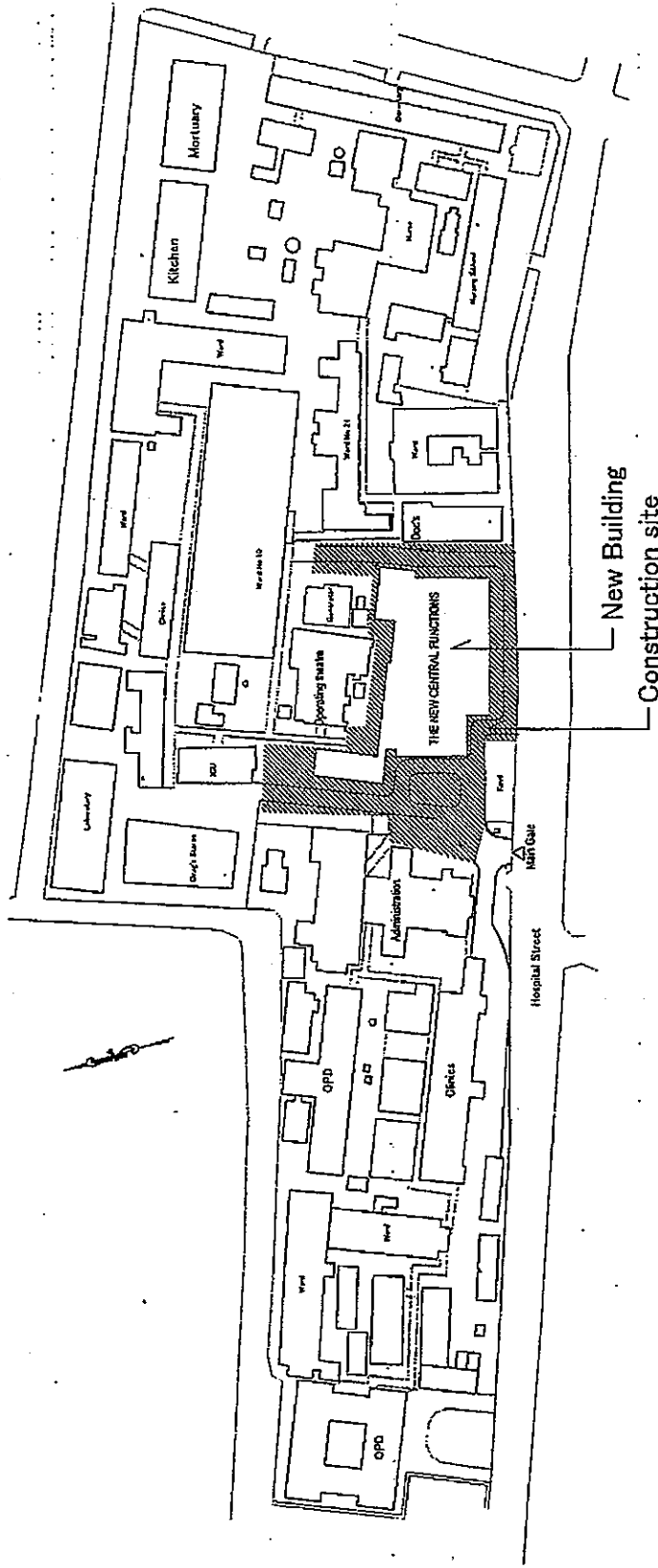
4-4. Confidentiality of the Report

Both sides confirmed that the contents of the draft final report should be confidential until the time of tender.

4-5. Works Related to Preparation for Construction

Sri Lankan side promised provision of land for temporary office, workers' lodgings, materials yard, etc. outside the premises of the Hospital

Appendix 1



Project Site Plan

THE PROJECT FOR THE IMPROVEMENT OF CENTRAL FUNCTIONS OF

JAFFNA TEACHING HOSPITAL

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Appendix 2

Outline of Facilities

4th Floor	(Space for Future Expansion of Rooms for Medical Education)	Space for Air Conditioner Outdoor Units	Elevated Water Tank		
3rd Floor	Operation Dept. Management Room	ICUs 20 ICU beds 2 Rooms for infections		Generator	
2nd Floor	Operation Theater Complex 8 Operation rooms (incl. 2 for aseptic), Recovery Rooms	Central Laboratory Complex Clinical Pathology, Hematology, Biochemistry, Microbiology			Water Reservoir, etc.
1st Floor	Central Facilities for Diagnostic Imaging 4 Radiology Rooms, Dental X-ray, Mammography Endoscopy Room, CT Room Physiology Room (8 booths, ECG, EEG, Ultrasound)	Central Supply & Sterilizing Dept. Machinery Room, etc.			

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Appendix 3 Equipment list

Item No.	Description	Q'ty
OT-01	Anesthetic apparatus	4
OT-02	Anesthetic apparatus with ventilator	5
OT-03	Autoclave, large size	2
OT-04	Autoclave, medium size	2
OT-05	Blood warmer	6
OT-06	Defibrillator	2
OT-07	Drug cabinet	4
OT-08	Electrosurgical unit	8
OT-09	Instrument set for general surgery	2
OT-10	Laryngoscope set	4
OT-11	Instrument set for micro vascular surgery	1
OT-12	Instrument set for minor and intermediate surgery	1
OT-13	Instrument set for nephrectomy	1
OT-14	Instrument set for neurology	1
OT-15	Neonatal resuscitator with over head warmer	1
OT-16	Operation Lamp, complete type	4
OT-17	Operation Lamp, simple type	4
OT-18	Operation Lamp, mobile with battery back up unit	3
OT-19	Operation monitor	8
OT-20	Operation table	7
OT-21	Operation table for orthopedic	1
OT-22	Recovery bed	8
OT-23	Shelf for container	2
OT-24	Shelf for instrument	2
OT-25	Sink unit	1
OT-26	Sterilizing container	1
OT-27	Stretcher	2
OT-28	Suction unit, portable type	3
OT-29	Suction unit, kick type	8
OT-30	Surgical hand scrub unit	10
OT-31	Syringe pump	4
OT-32	Working table	2
OT-33	X-ray film viewer, large, wall mount type	11
OT-34	Automatic disinfectant	1
IC-01	Ambubag for adult	4
IC-02	Ambubag for pediatrics	2
IC-03	Autoclave, table top type	1
IC-04	Blood warmer	4
IC-05	Central monitor	1
IC-06	Defibrillator	1
IC-07	EKG	1
IC-08	ICU bed	22
IC-09	Infusion pump	10
IC-10	Laryngoscope set	3
IC-11	Ophthalmoscope	2
IC-12	Patient monitor	22
IC-13	Shelf for instrument	3
IC-14	Shelf for linen	3
IC-15	Spot lamp	1
IC-16	Stretcher	2
IC-17	Stretcher, radiotransparent	1
IC-18	Suction unit, wall mount type	7
IC-19	Suction unit, portable type	2
IC-20	Syringe pump	10
IC-21	Ventilator for adult	7
IC-22	Ventilator for pediatrics	2
IC-23	X-ray film viewer, large, wall mount type	2
LA-01	Autoclave, table top type	1
LA-02	Autoclave, vertical type	1
LA-03	Automatic biochemistry analyzer	1
LA-04	Electronic balance	2

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Appendix 3 Equipment list (continued)

Item No.	Description	Qty
LA-05	Bilirubinmeter	1
LA-06	Blood gas analyzer	1
LA-07	Centrifuge	3
LA-08	Drying cabinet	1
LA-09	Electrophoresis system	1
LA-10	ELISA reader	1
LA-11	ELISA washer	1
LA-12	Flamephotometer	1
LA-13	Deep freezer	1
LA-14	Heat dry block	1
LA-15	Hot air oven	1
LA-16	Hot plate stirrer	1
LA-17	Incubator	1
LA-18	Laminar flow cabinet	1
LA-19	Media sterilizer	1
LA-20	Micro plate viewer	1
LA-21	Microscope	4
LA-22	Microscope with CCD camera and monitor	1
LA-23	Microtome, rotary type	1
LA-24	Osmometer	1
LA-25	PH meter	1
LA-26	Plate incubator	1
LA-27	Refrigerator	1
LA-28	Rotamixer	2
LA-29	Hematology mixer	1
LA-30	Semi automated coagulation analyzer	1
LA-31	Slide staining apparatus	1
LA-32	Spectrophotometer	1
LA-33	Stirrer	1
LA-34	Tissue processing apparatus	1
LA-35	Urine meter	1
LA-36	Water bath	2
RA-01	Dark room accessories	1
RA-02	Dental X-ray, panorama type	1
RA-03	Examination table	2
RA-04	Mammography unit	1
RA-05	Mobile X-ray unit	1
RA-06	Pass box	1
RA-07	Ultrasound scanner, B/W	1
RA-08	Ultrasound scanner, color doppler	1
RA-09	X-ray film processor	1
RA-10	X-ray film viewer, small, wall mount type	1
RA-11	X-ray film viewer, large, wall mount type	2
RA-12	X-ray protective set	1
RA-13	X-ray system, fluoroscopy	1
RA-14	X-ray system, simple bucky and stand	3
VS-01	Bronchoscope	1
VS-02	Colonoscope	1
VS-03	Cystoscope	1
VS-04	Endoscopic retrograde cholangiopancreatography	1
VS-05	Endoscopic cabinet	1
VS-06	Examination table for endoscope	2
VS-07	Upper gastrointestinalscope	1
EE-01	EEG	1
EE-02	Examination table	1
EC-01	ECG	2
EC-02	ECG, holter testing	1
EC-03	ECG, stress testing	1
EC-04	Examination table	2
CO-01	Multimedia projector	1
ME-01	Tool set	1

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